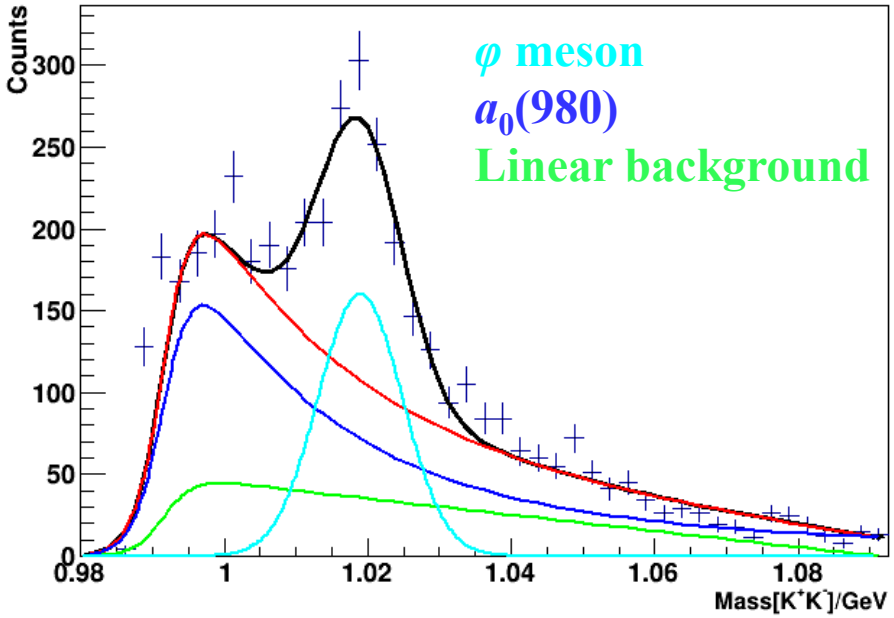
Low-mass $K^+K^-\pi^0$

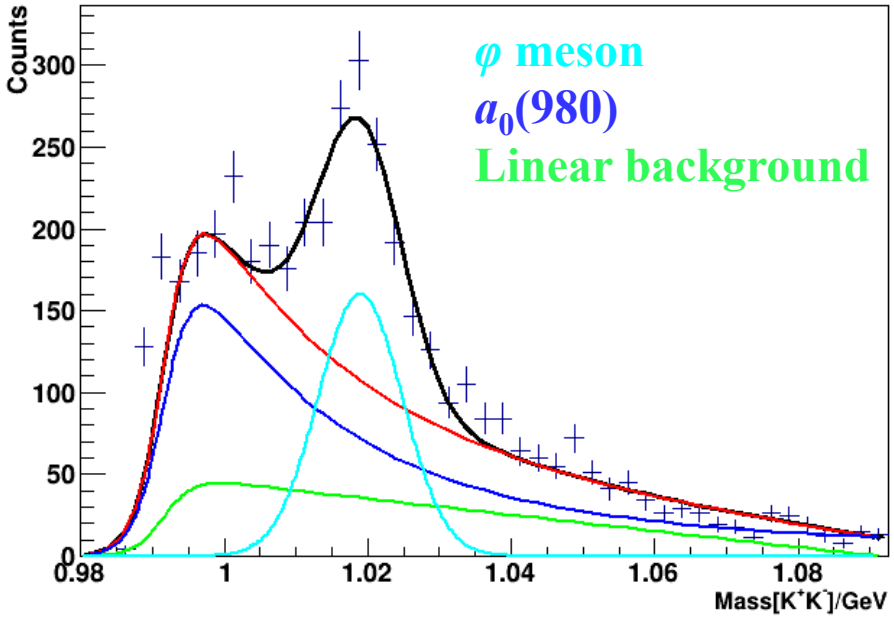
Fit to K^+K^-

- Fitting function includes
  - φ meson : Gaussian function



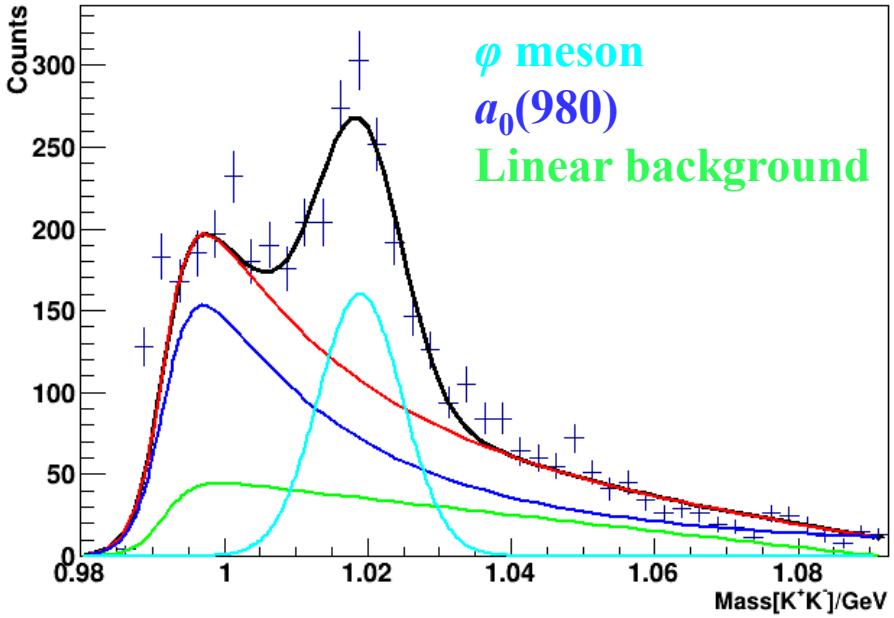
Fit to K^+K^-

- Fitting function includes
  - φ meson : Gaussian function
  - Linear background multiplied by sigmoid (for threshold behavior)



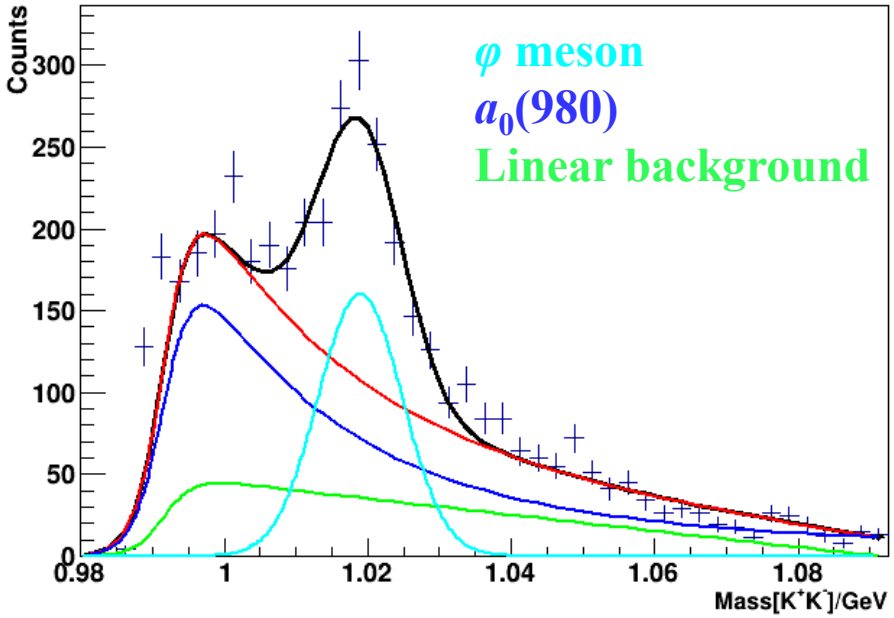
Fit to K^+K^-

- Fitting function includes
  - φ meson : Gaussian function
  - Linear background multiplied by sigmoid (for threshold behavior)
  - $a_0(980)$: Voigtian (multiplied by sigmoid) with



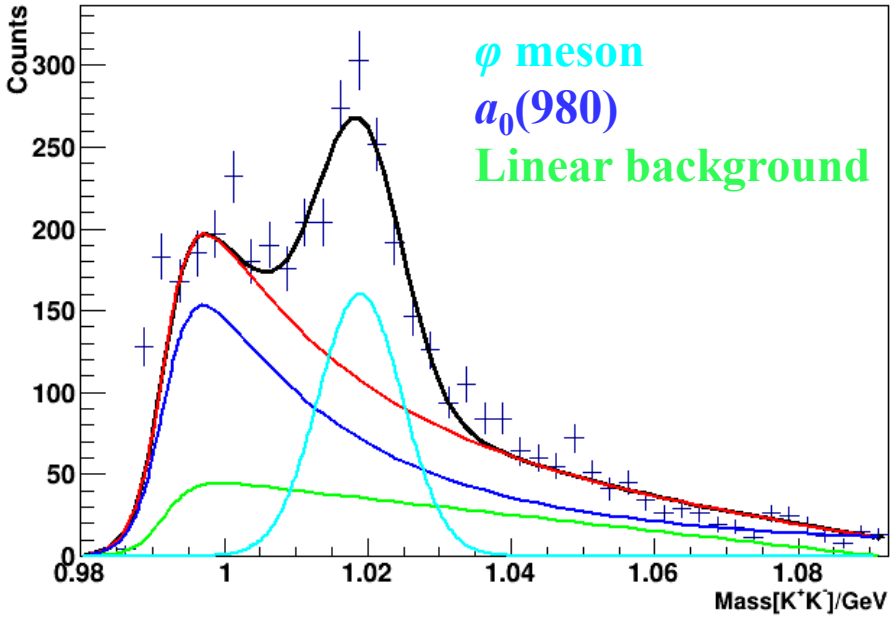
Fit to K^+K^-

- Fitting function includes
  - φ meson : Gaussian function
  - Linear background multiplied by sigmoid (for threshold behavior)
  - $a_0(980)$: Voigtian (multiplied by sigmoid) with
    - Center locked at 980 MeV



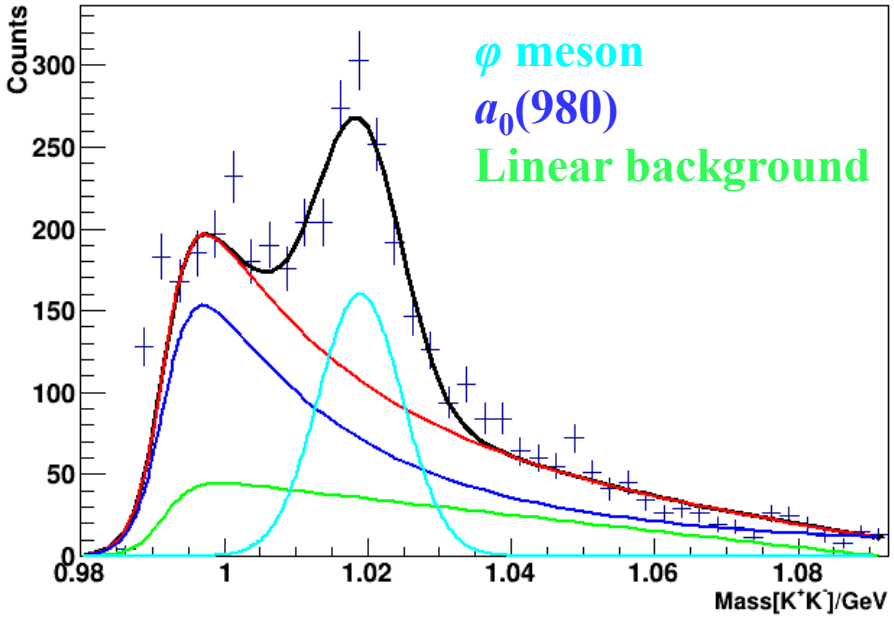
Fit to K^+K^-

- Fitting function includes
  - φ meson : Gaussian function
  - Linear background multiplied by sigmoid (for threshold behavior)
  - $a_0(980)$: Voigtian (multiplied by sigmoid) with
    - Center locked at 980 MeV
    - Width allowed to vary between 50 and 100 MeV



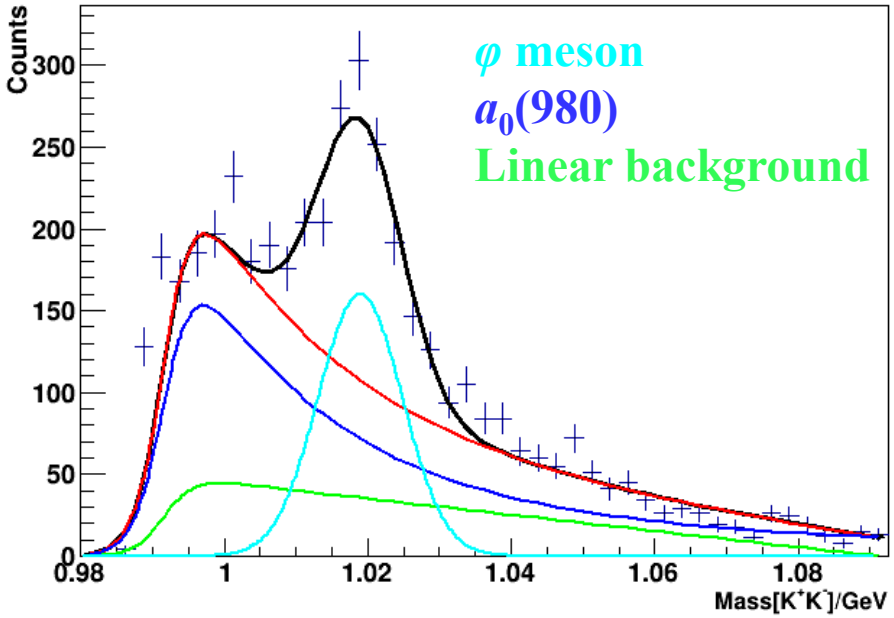
Fit to K^+K^-

- Fitting function includes
  - φ meson : Gaussian function
  - Linear background multiplied by sigmoid (for threshold behavior)
  - $a_0(980)$: Voigtian (multiplied by sigmoid) with
    - Center locked at 980 MeV
    - Width allowed to vary between 50 and 100 MeV
    - Standard deviation of the gaussian convolution locked to standard deviation from φ meson



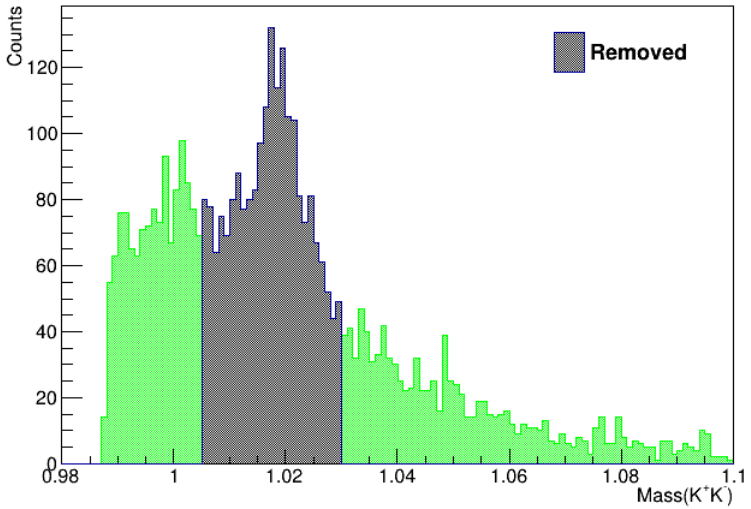
Fit to K^+K^-

- Fitting function includes
  - φ meson : Gaussian function
  - Linear background multiplied by sigmoid (for threshold behavior)
  - $a_0(980)$: Voigtian (multiplied by sigmoid) with
    - Center locked at 980 MeV
    - Width allowed to vary between 50 and 100 MeV
    - Standard deviation of the gaussian convolution locked to standard deviation from φ meson

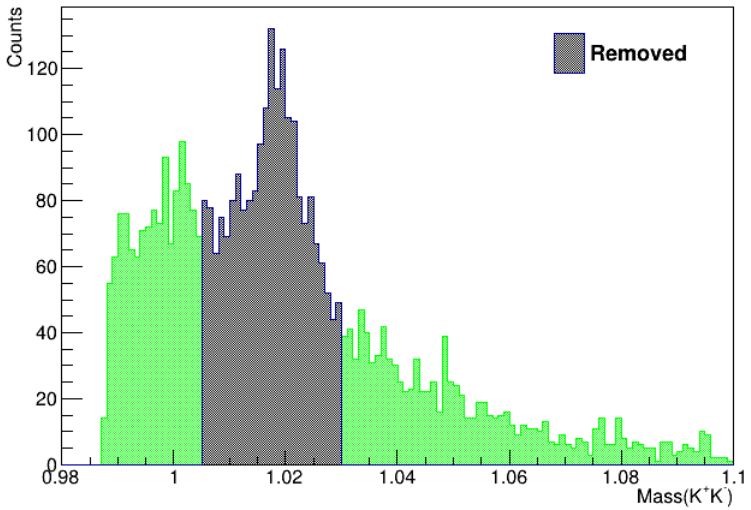


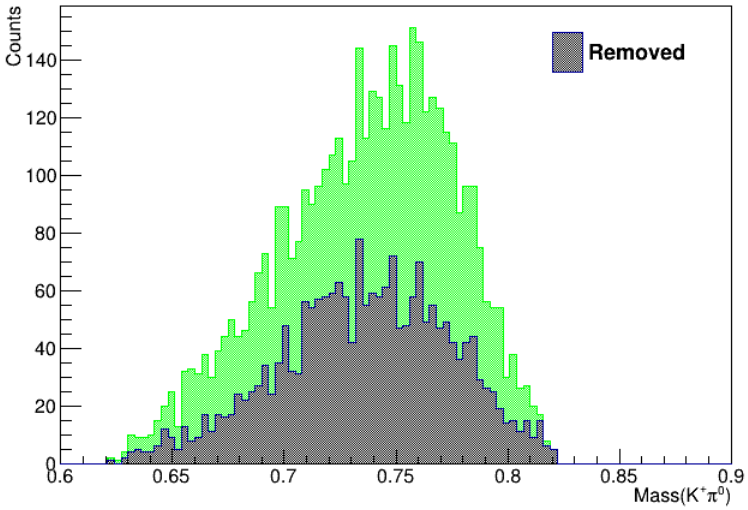
- Possible large contribution from $a_0(980)$ or $f_0(980)$

Removal of the φ

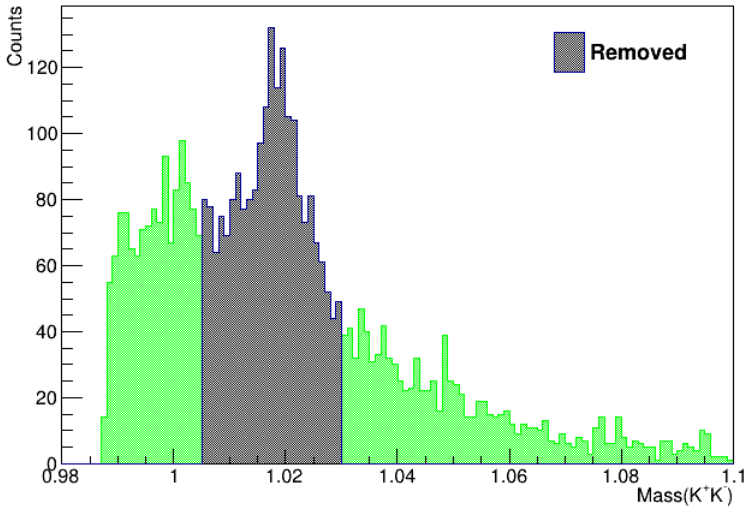


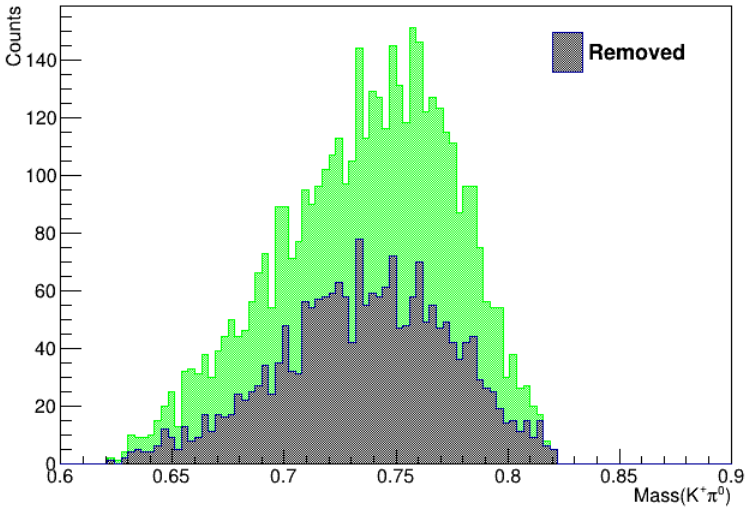
Removal of the φ

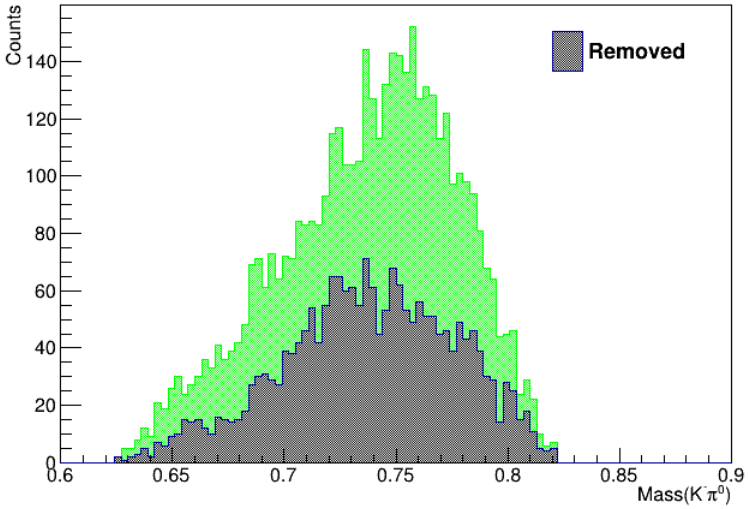




Removal of the φ

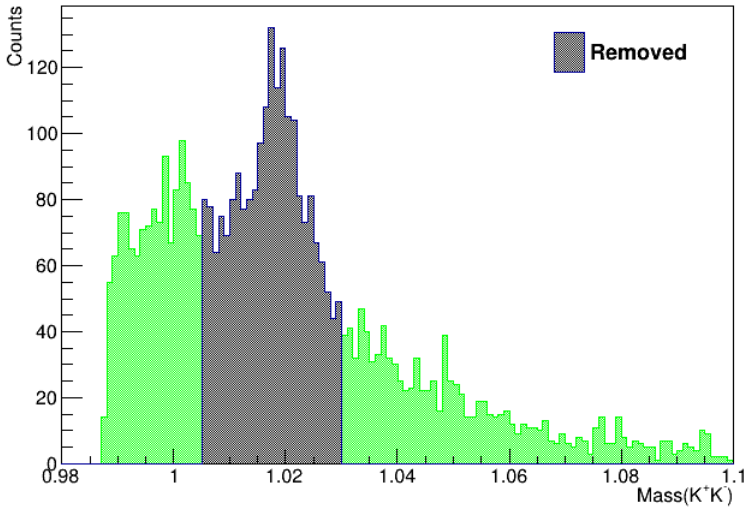


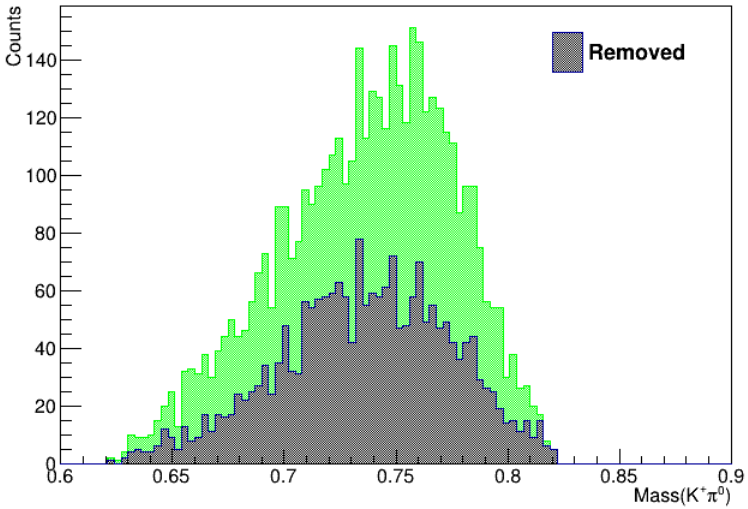


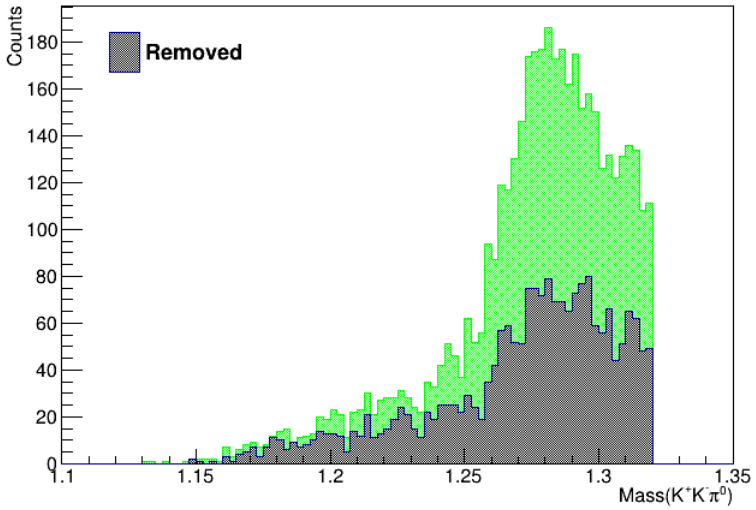


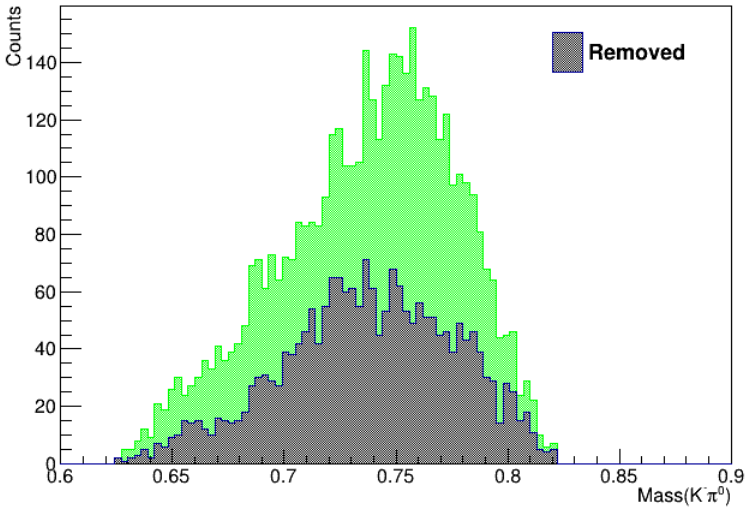
ASU

Removal of the φ



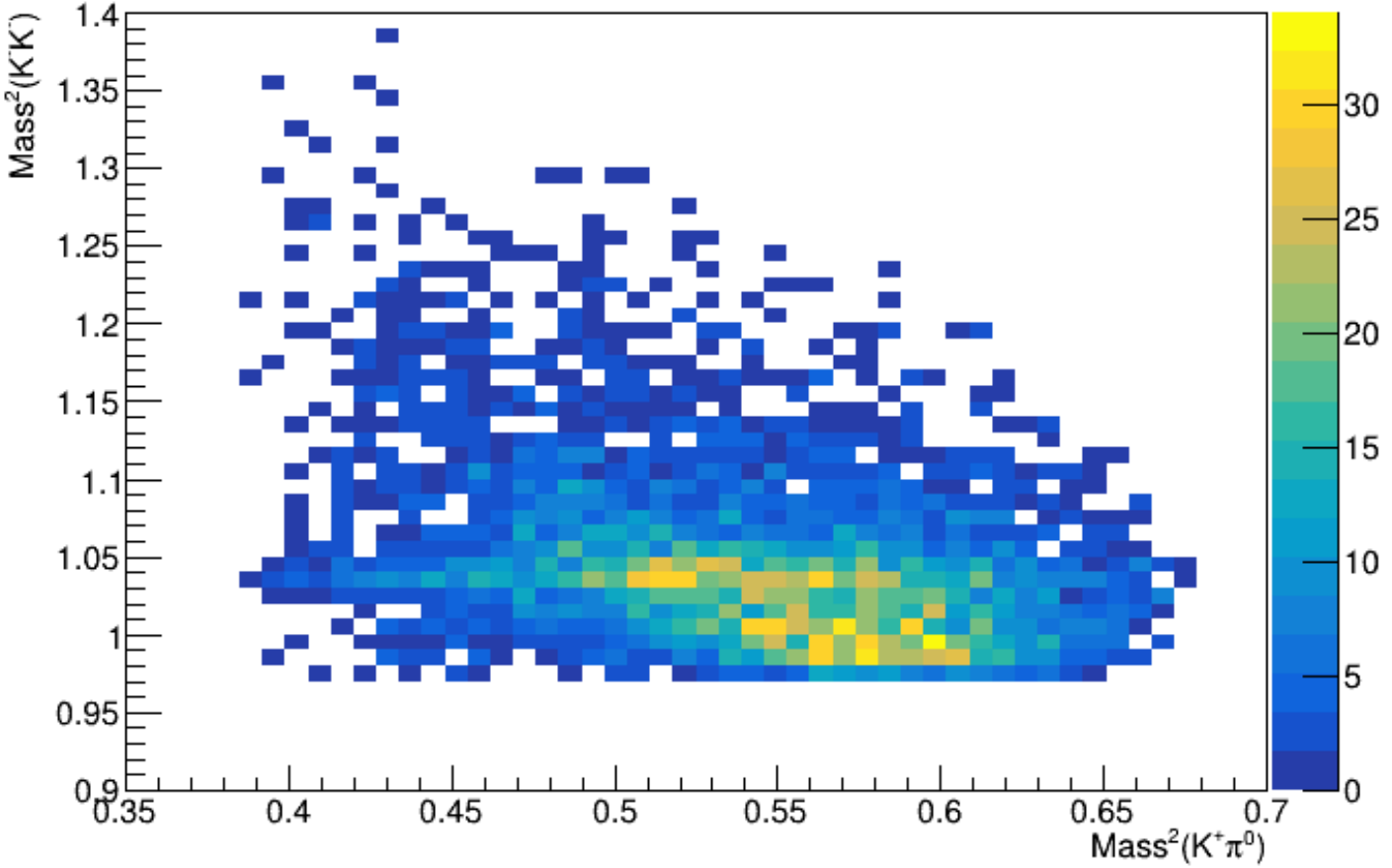






Dalitz plots

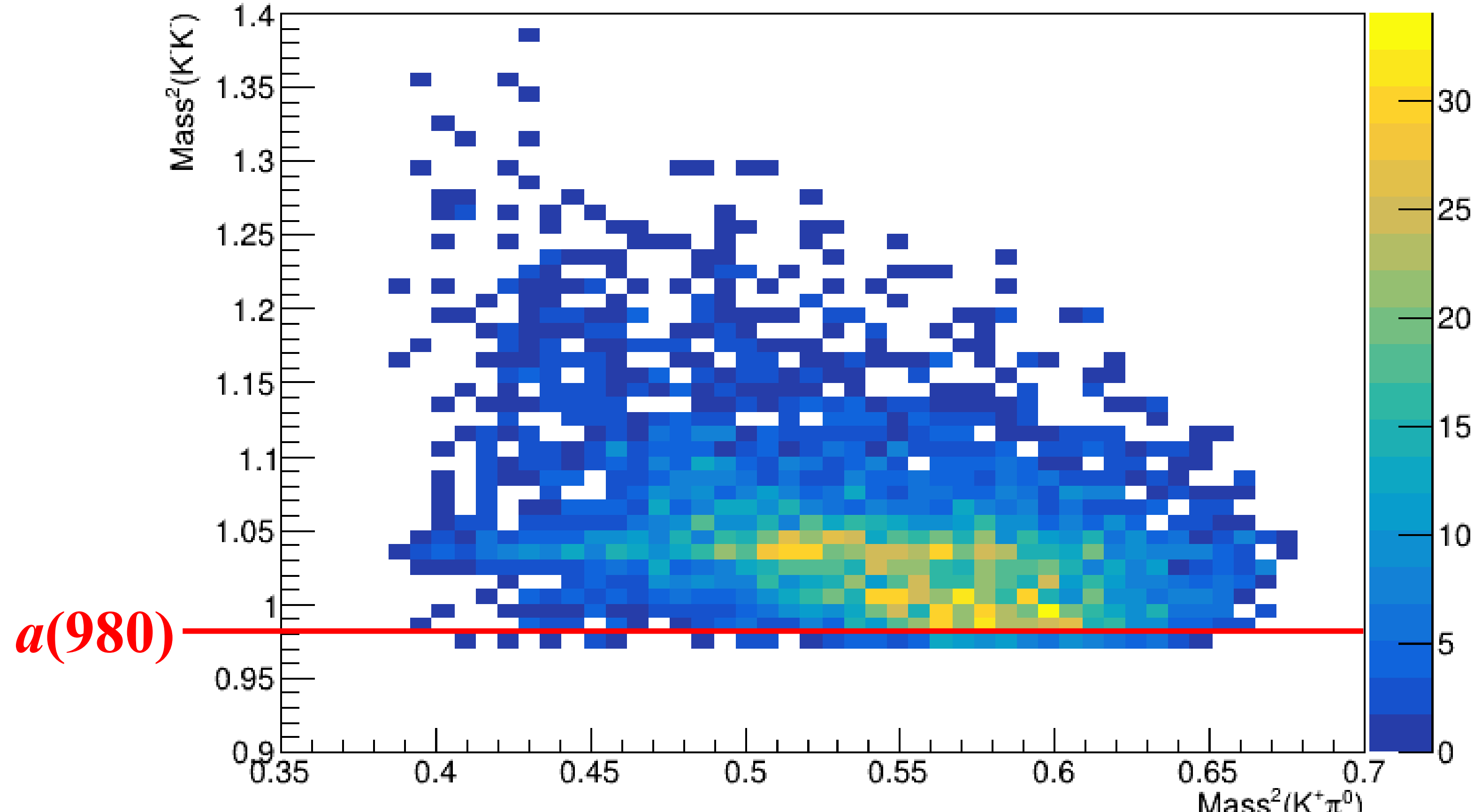
with mass($K^+K^-\pi^0$)
1225 – 1315 MeV



ASU

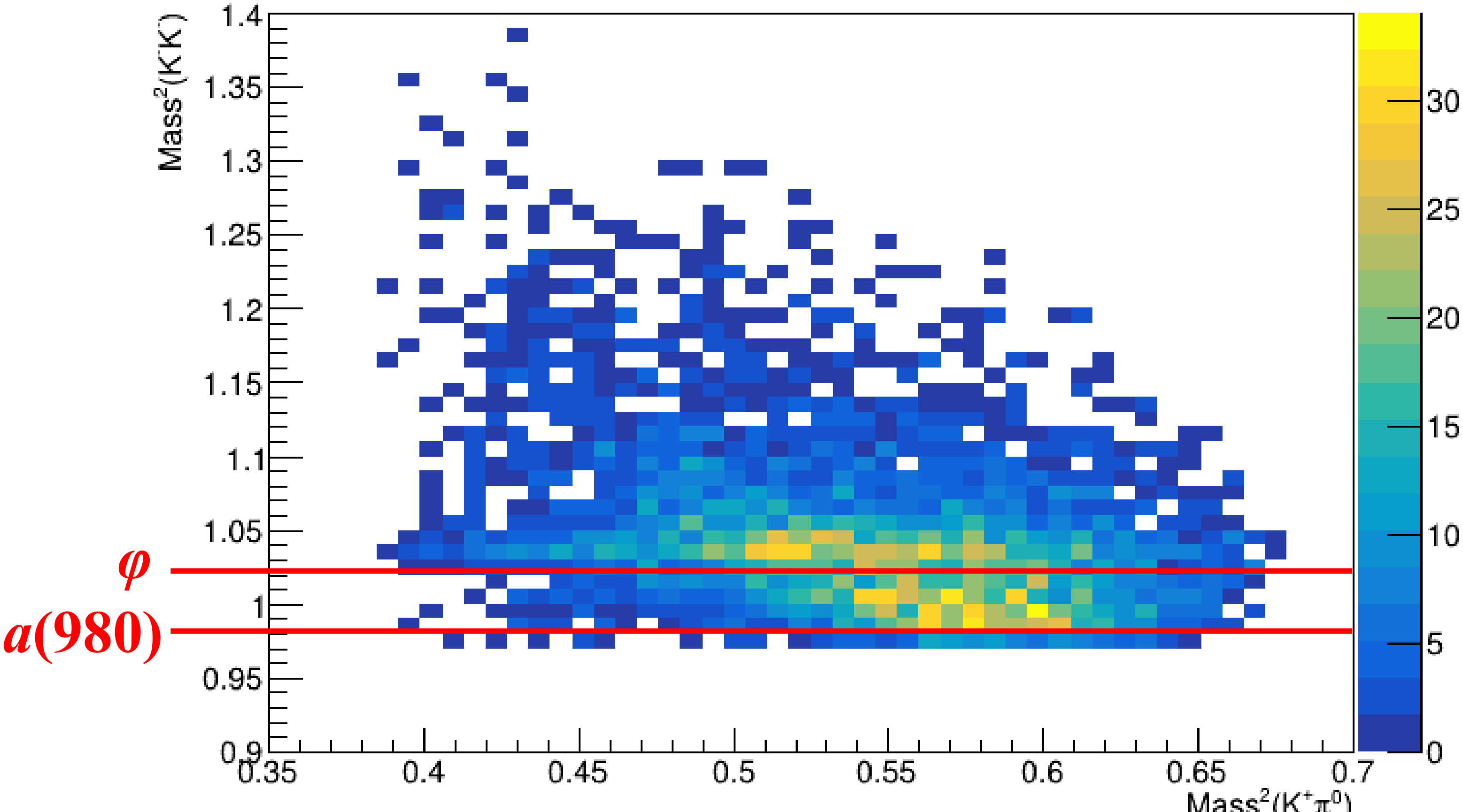
Dalitz plots

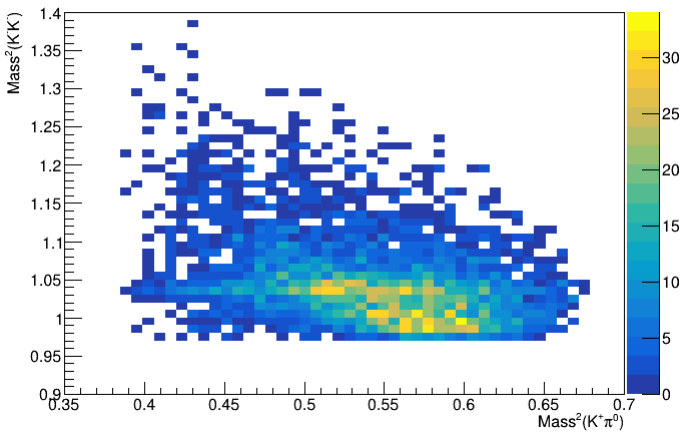
with mass($K^+K^-\pi^0$)
1225 – 1315 MeV



Dalitz plots

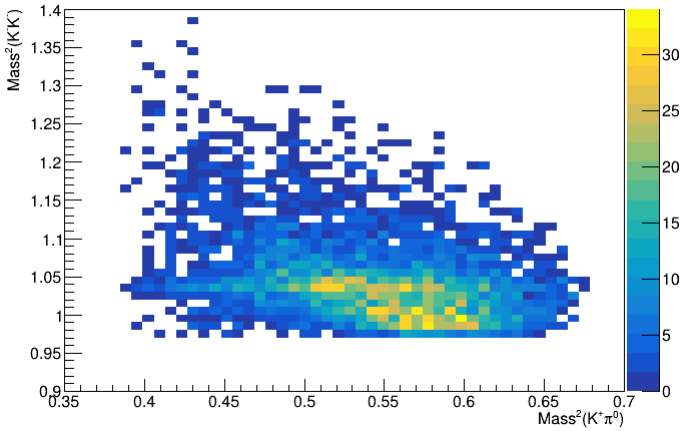
with mass($K^+K^-\pi^0$)
1225 – 1315 MeV





Dalitz plots

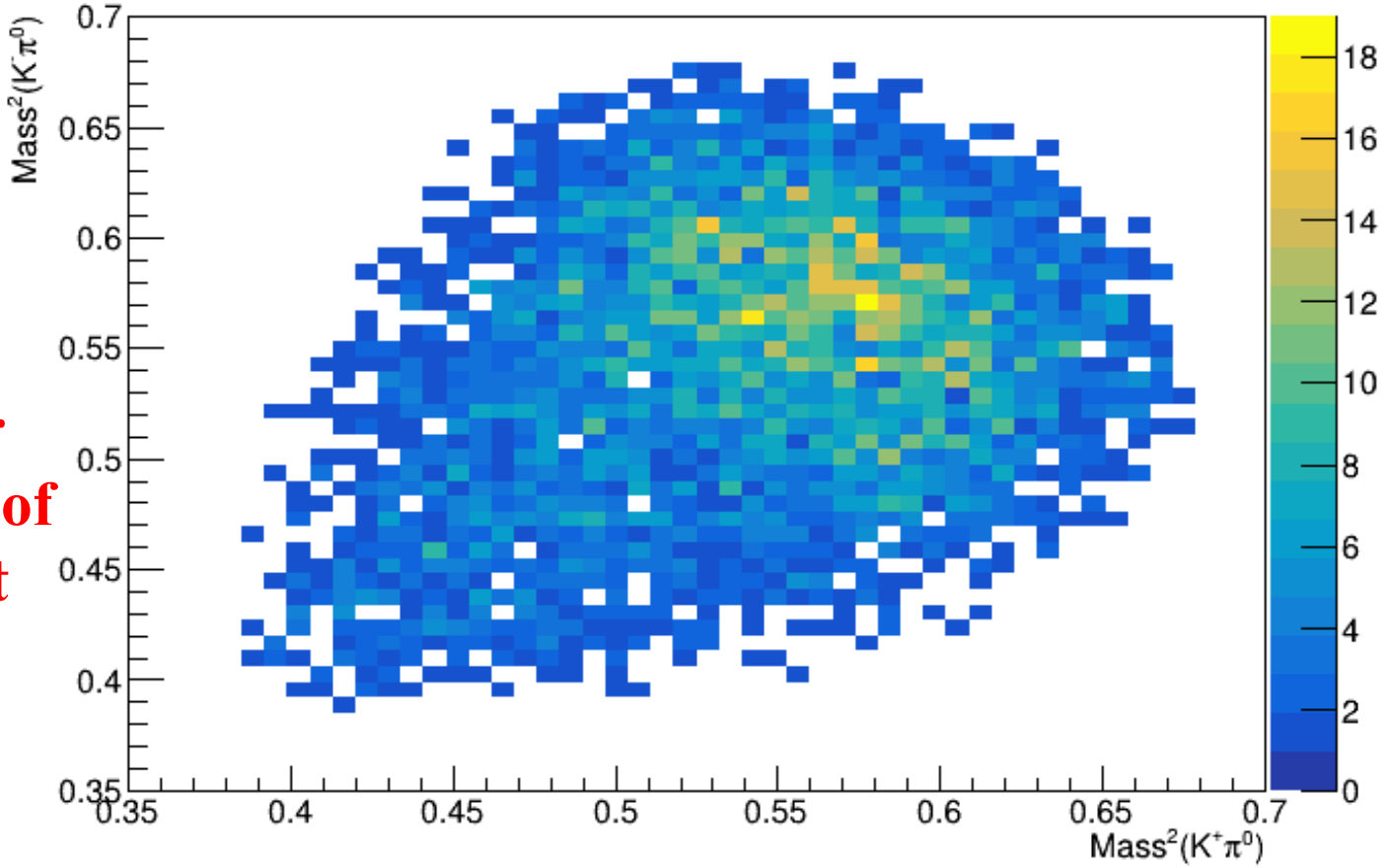
with mass($K^+K^-\pi^0$)
1225 – 1315 MeV



Dalitz plots

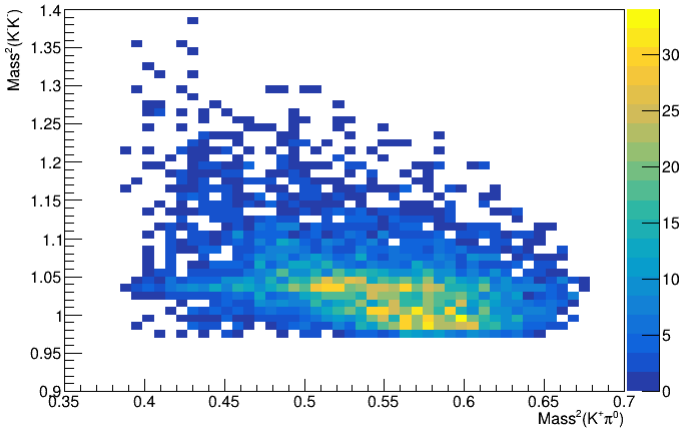
with mass($K^+K^-\pi^0$)
1225 – 1315 MeV

No clear horizontal or vertical bands of enhancement

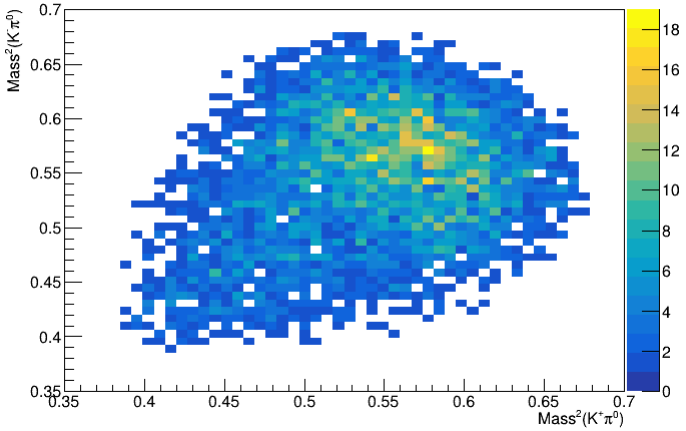


ASU

Dalitz plots

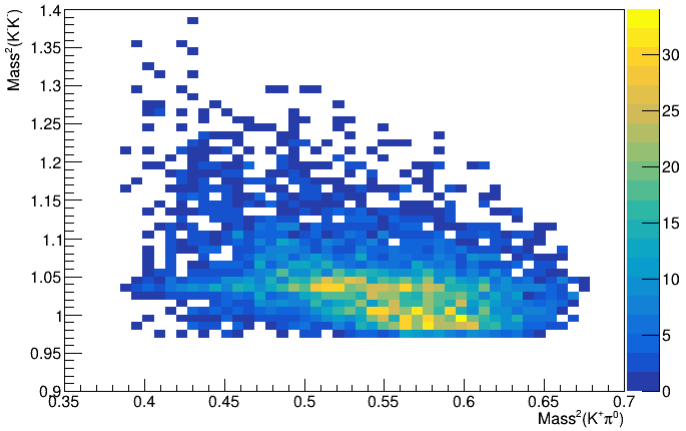


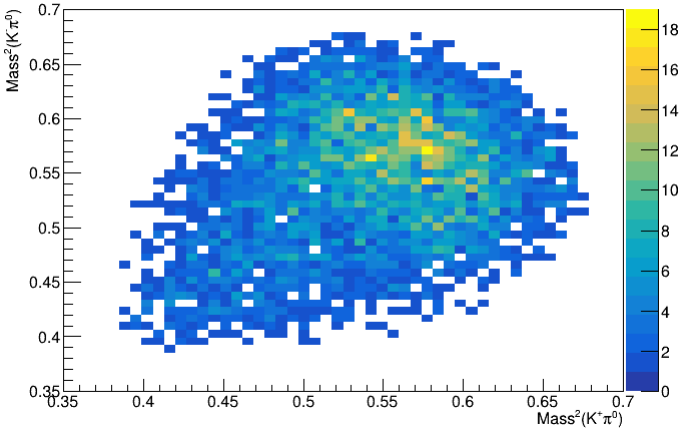
with mass($K^+K^-\pi^0$)
1225 – 1315 MeV

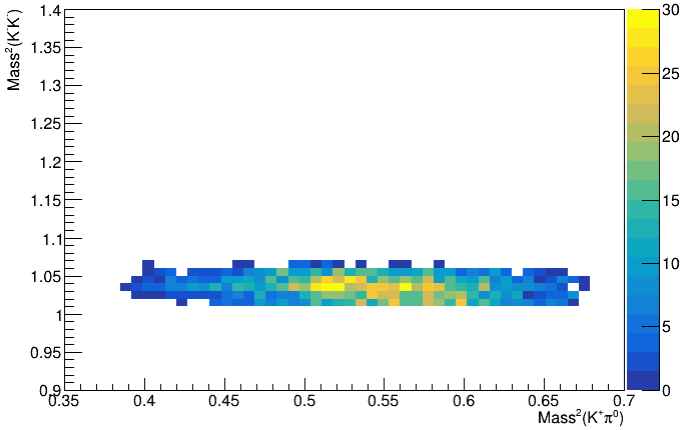


Dalitz plots

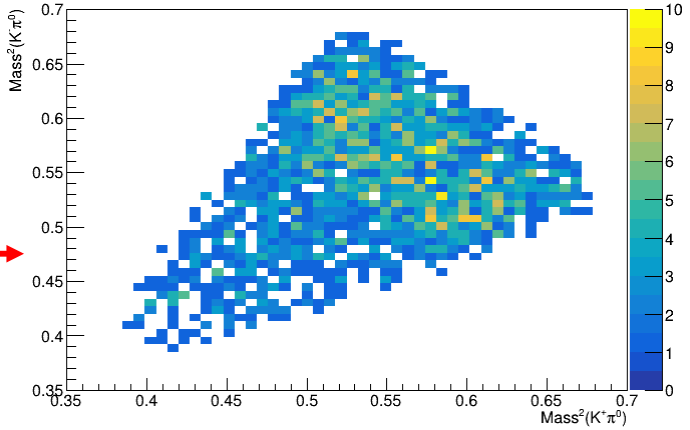
with mass($K^+K^-\pi^0$)
1225 – 1315 MeV





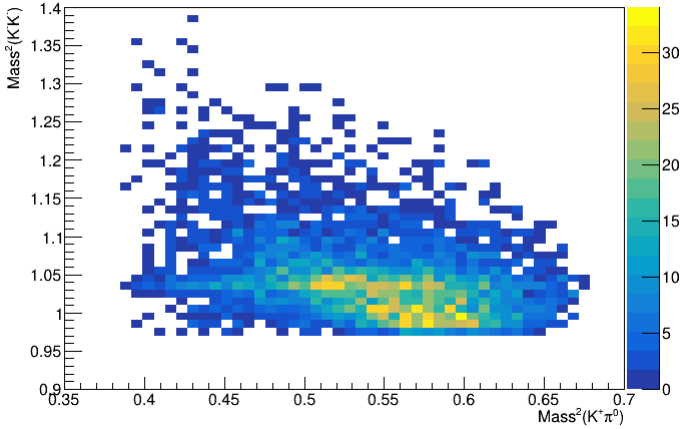


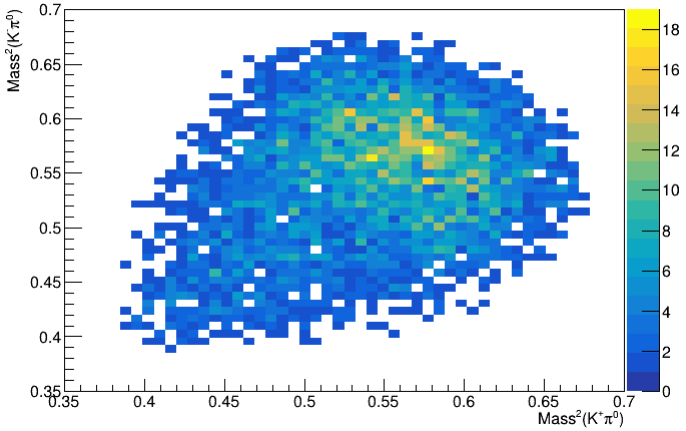
φ region only

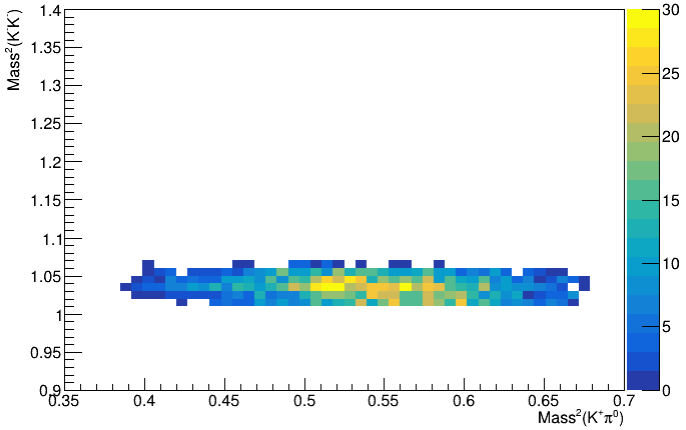


Dalitz plots

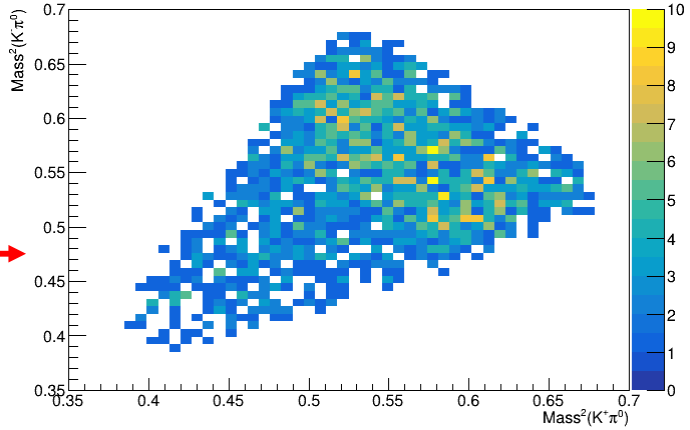
with mass($K^+K^-\pi^0$)
1225 – 1315 MeV

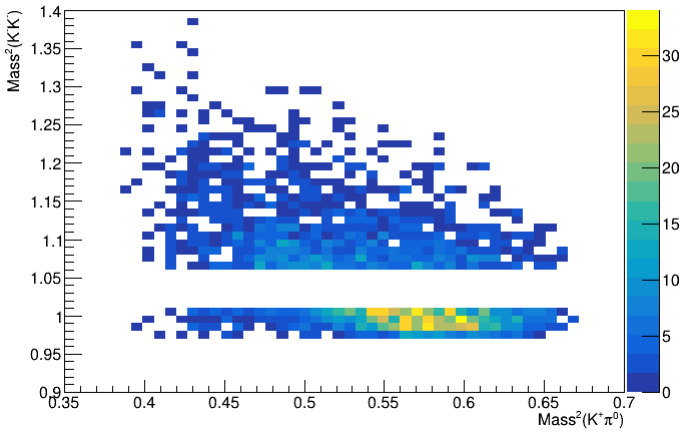




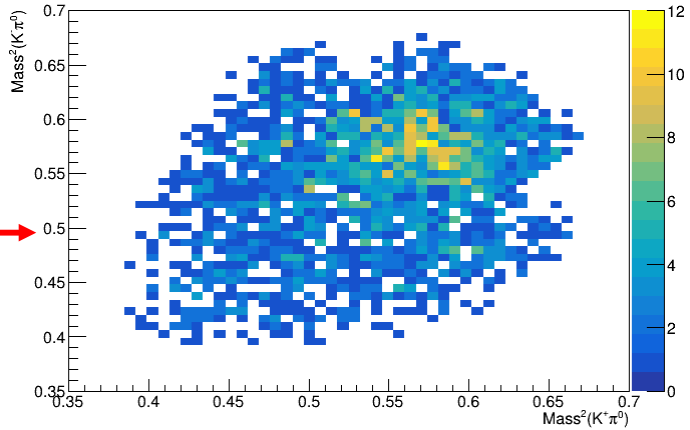


φ region only



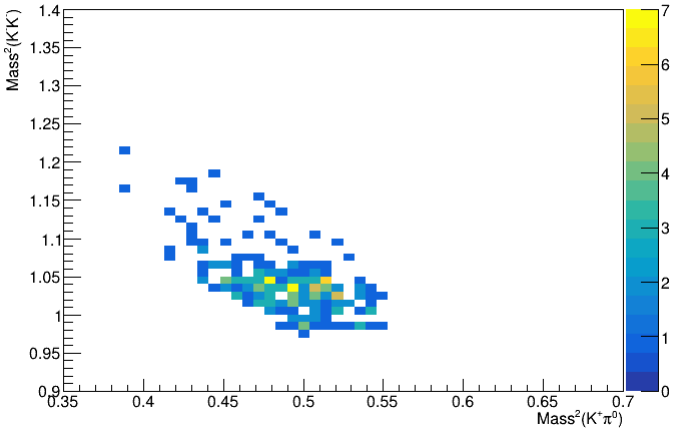


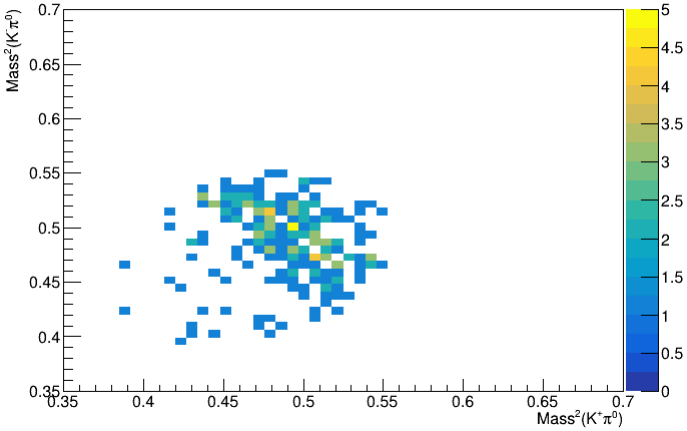
φ region removed

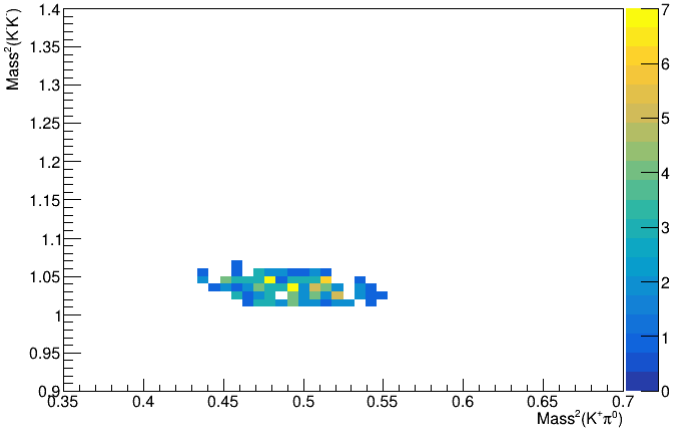


Dalitz plots

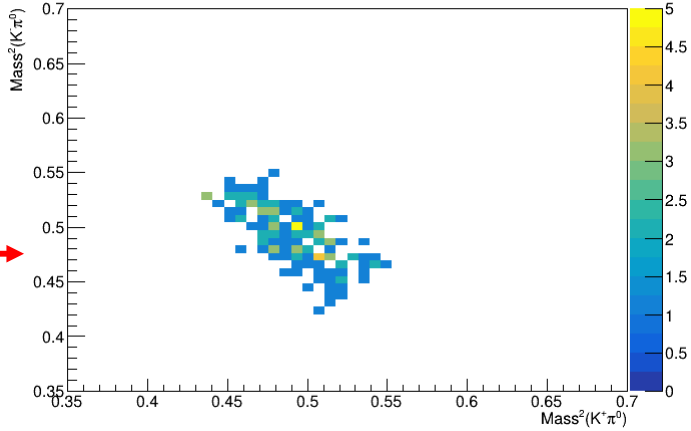
with mass($K^+K^-\pi^0$)
1220 – 1240 MeV

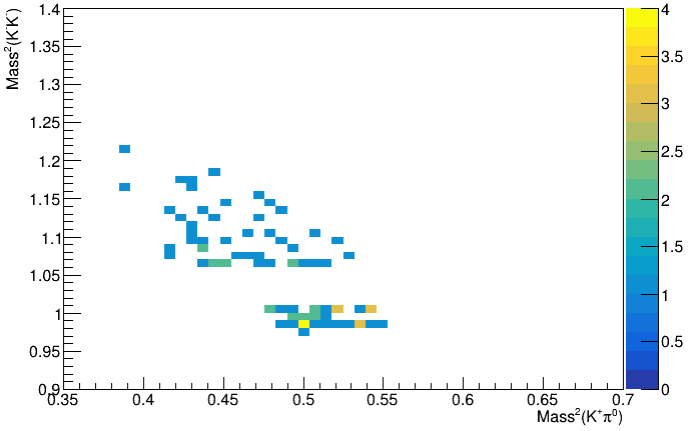






φ region only





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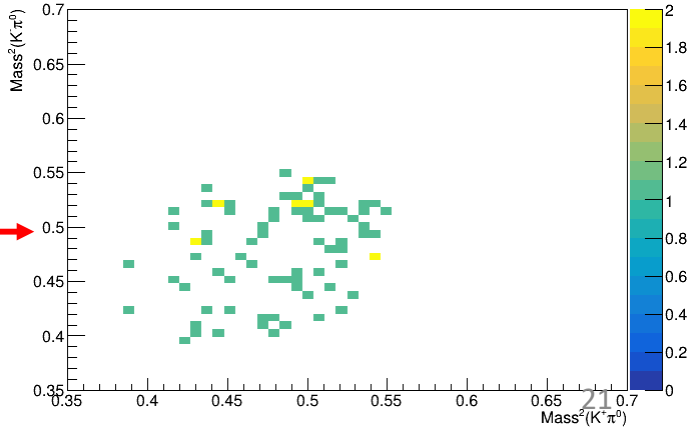
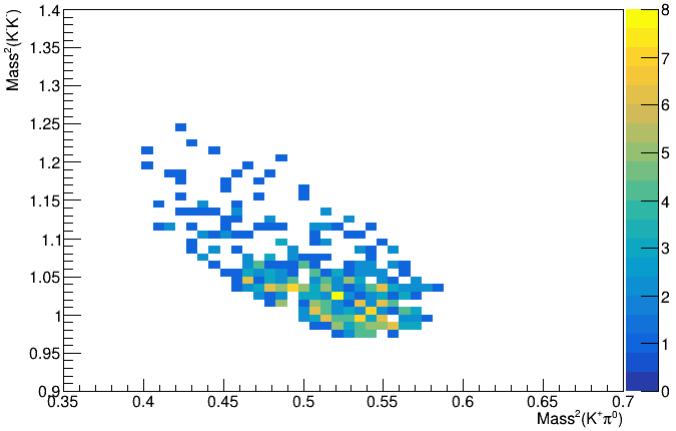
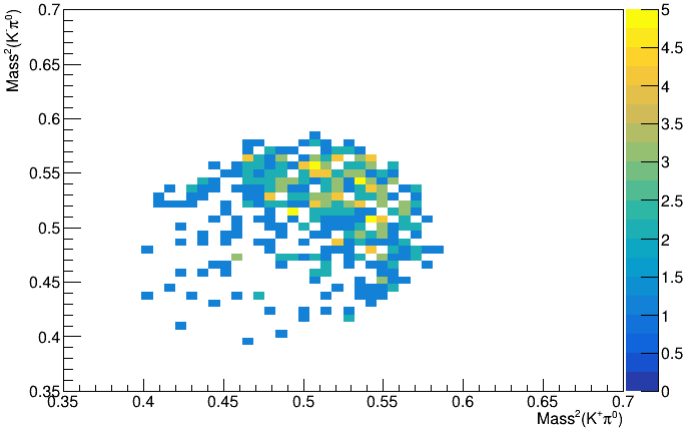
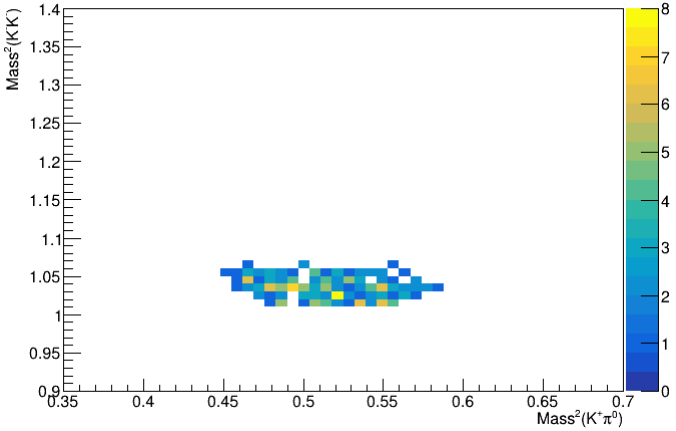


Dalitz plots

with mass($K^+K^-\pi^0$)
1240 – 1260 MeV







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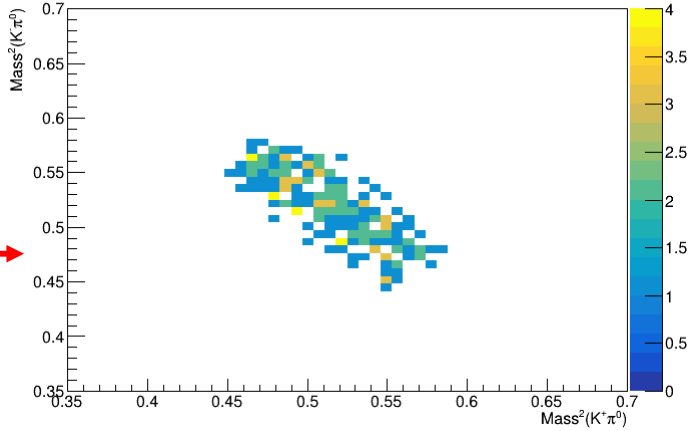

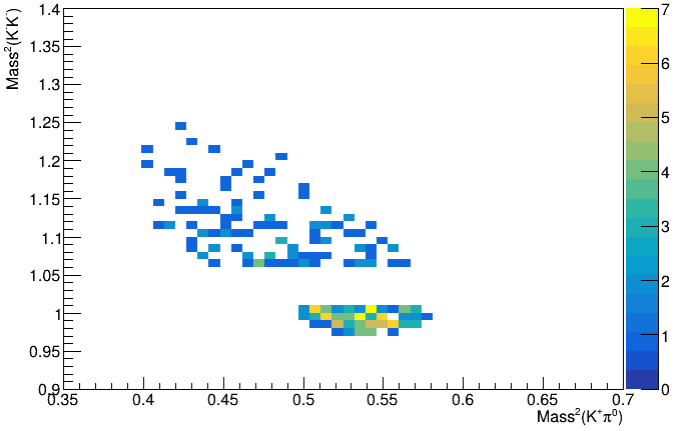

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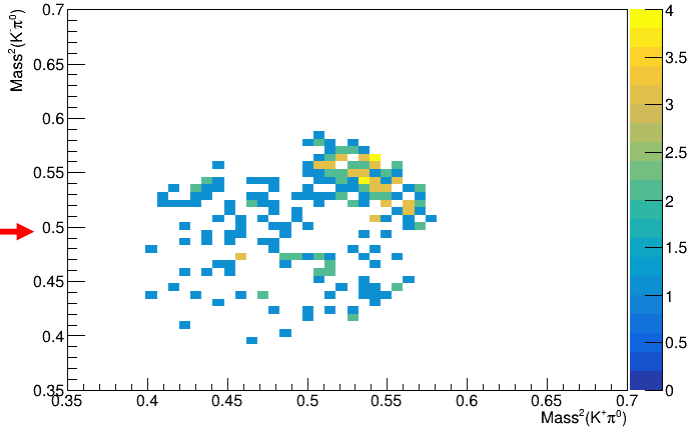
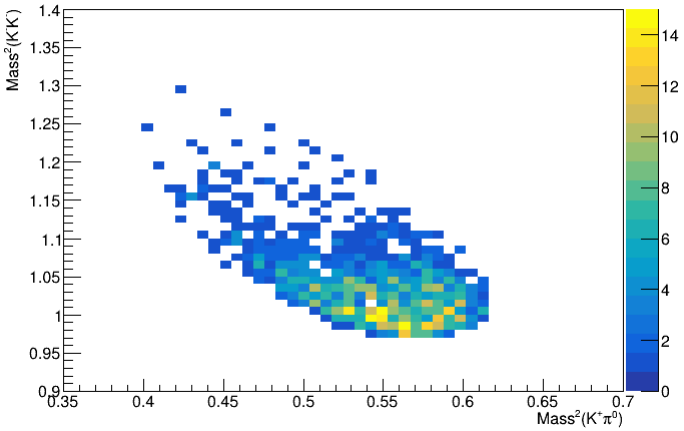
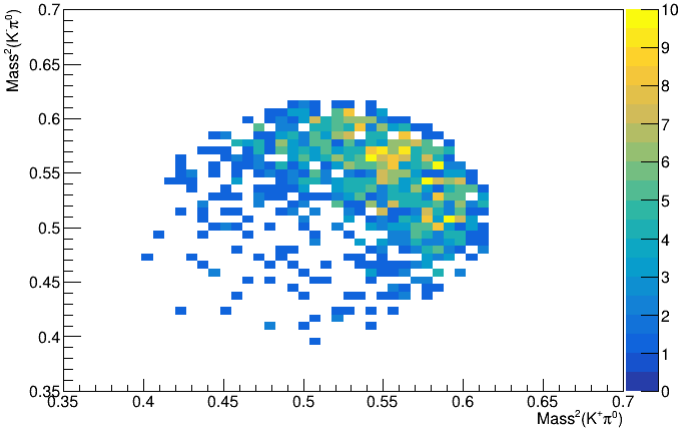
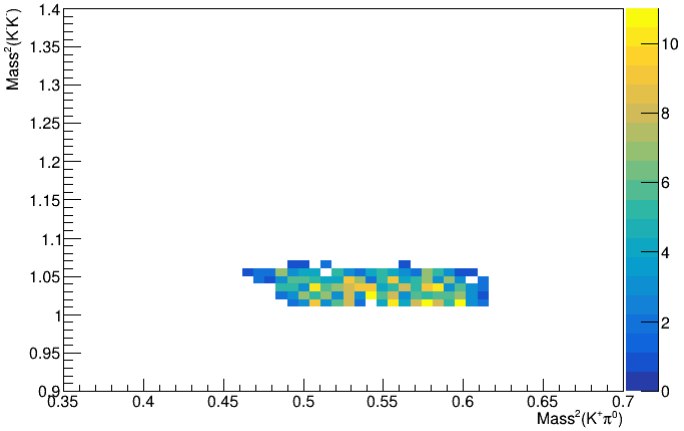


Dalitz plots

with mass($K^+K^-\pi^0$)
1260 – 1280 MeV







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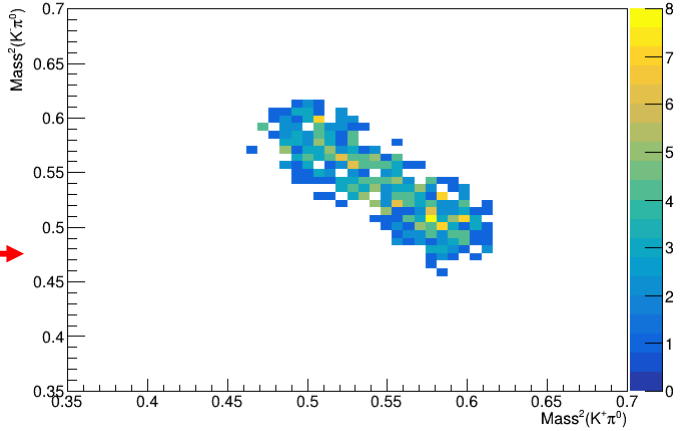

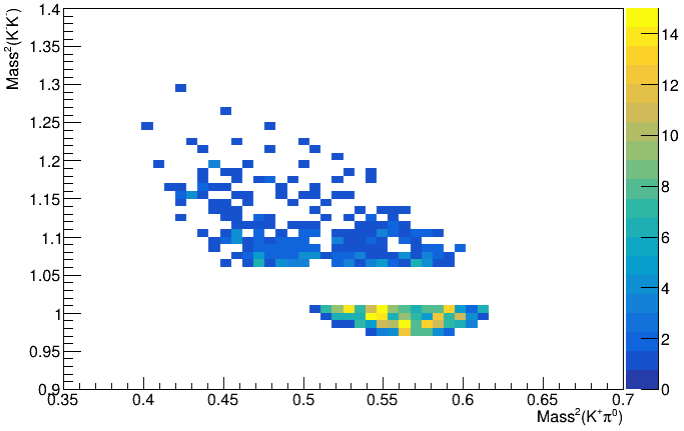

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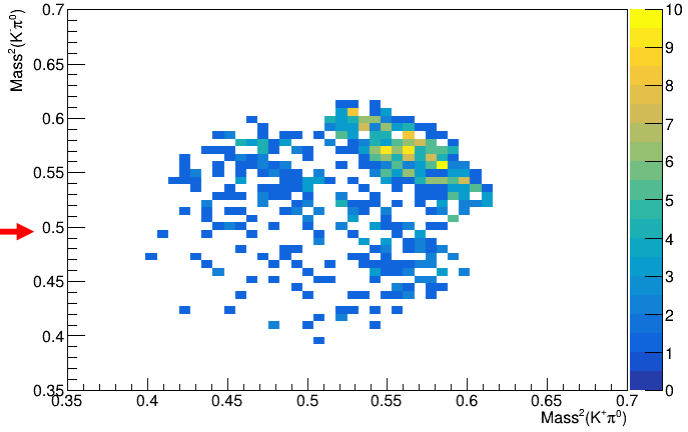
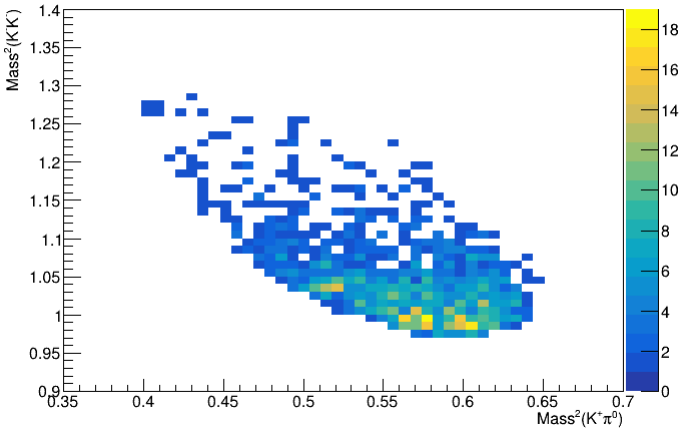
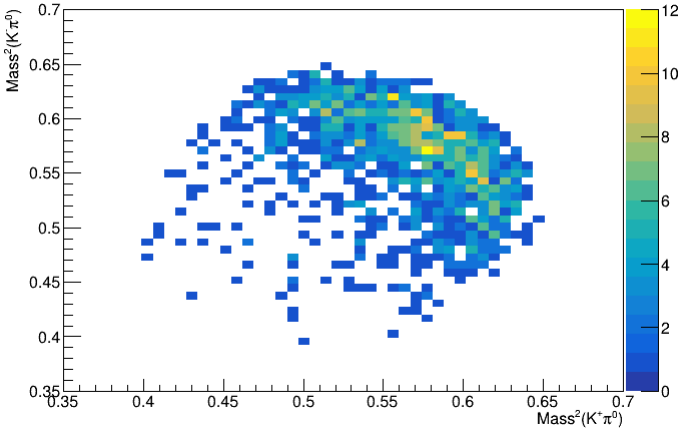
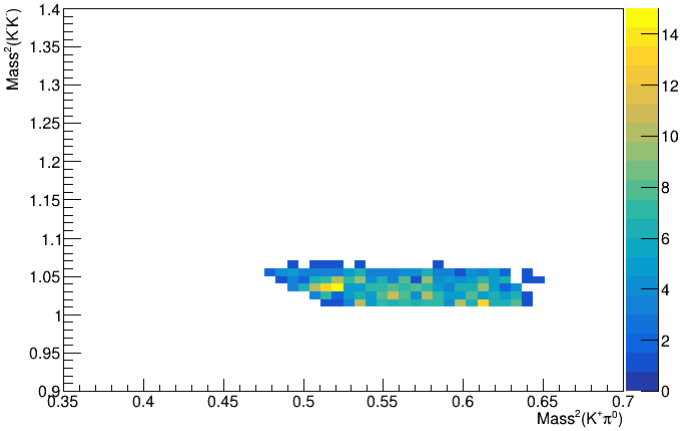


Dalitz plots

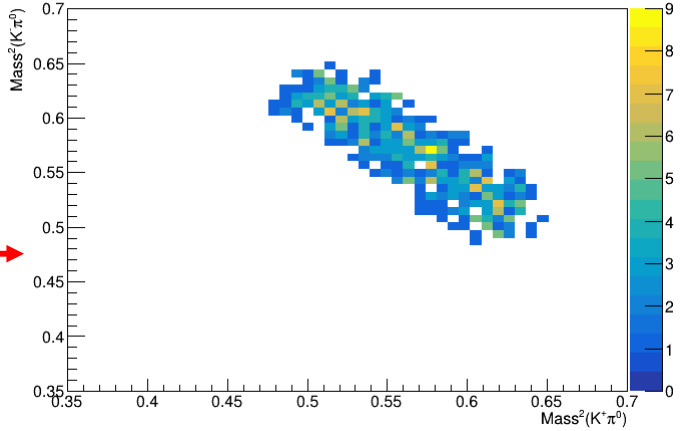
with mass($K^+K^-\pi^0$)
1280 – 1300 MeV

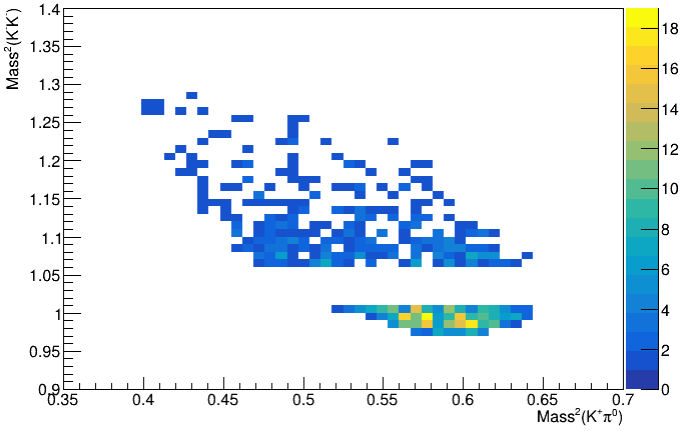




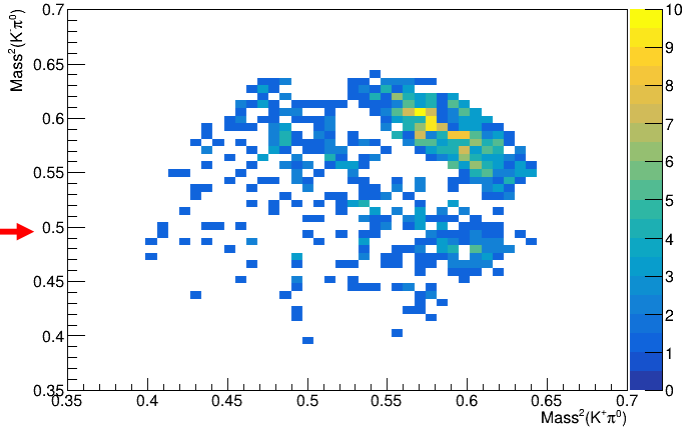


φ region only



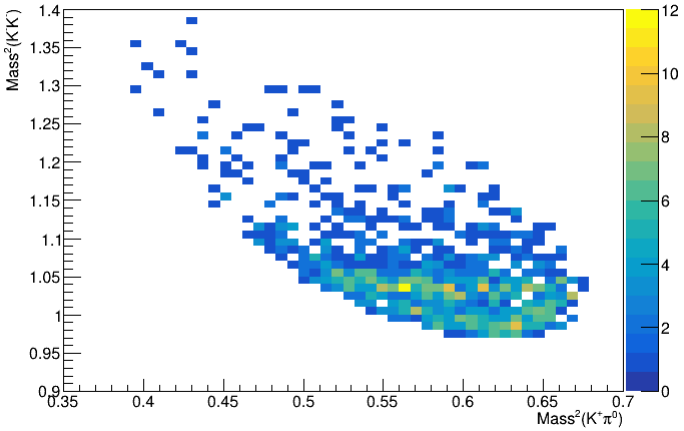


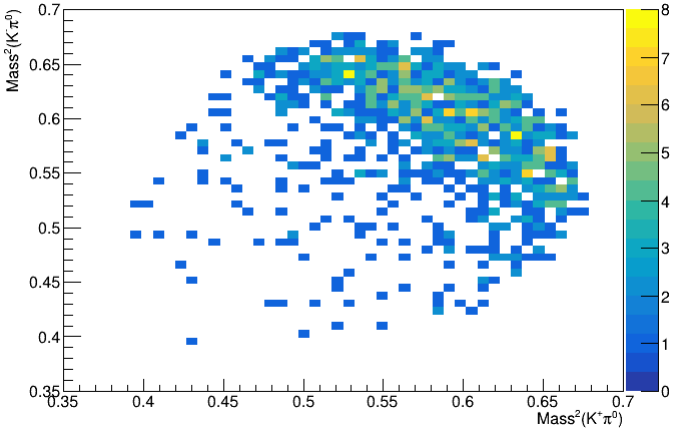
φ region removed

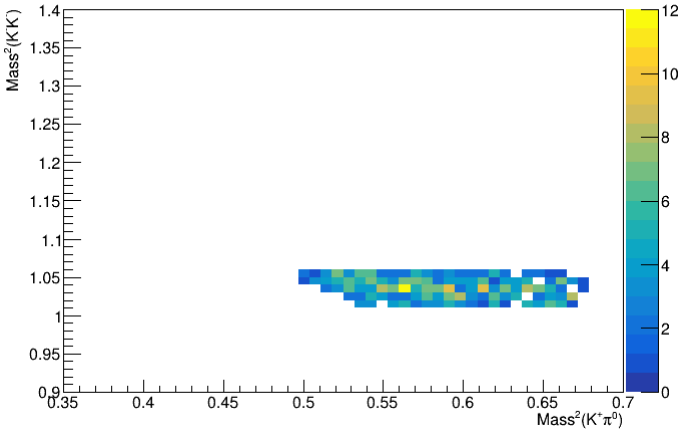


Dalitz plots

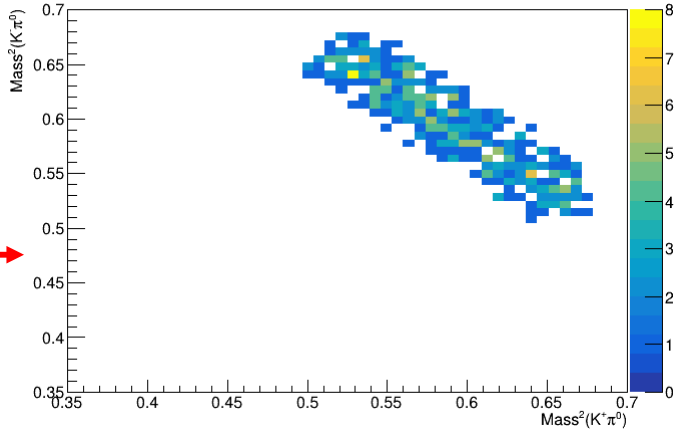
with mass($K^+K^-\pi^0$)
1300 – 1320 MeV

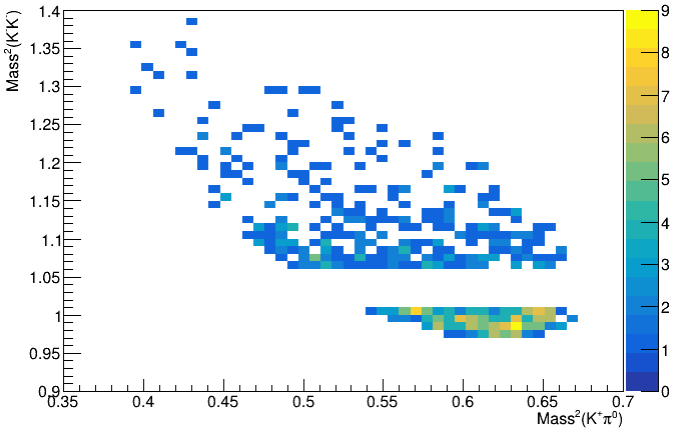




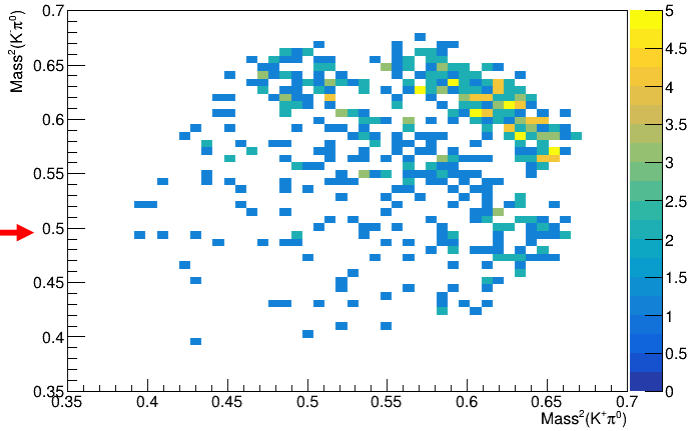


φ region only





φ region removed



Initial PWA setup

- Used PWA expression:

$$\sqrt{2l+1}\sqrt{2s+1}\,\frac{m_0\Gamma}{m_0{}^2 - m^2 - im_0\Gamma}\,a_{Jlsm}\sum_{\lambda} D^{J*}_{m\lambda}(\varphi_{GJ},\theta_{GJ})D^{s*}_{\lambda 0}(\varphi_h,\theta_h)\langle l0s\lambda|J\lambda\rangle,$$

where a_{Jlsm} are the coefficients of the fit

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- Used AmpTools for PWA

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$$\sqrt{2l+1}\sqrt{2s+1}\,\frac{m_0\Gamma}{m_0{}^2 - m^2 - im_0\Gamma}\,a_{Jlsm}\sum_{\lambda} D^{J*}_{m\lambda}(\varphi_{GJ},\theta_{GJ})D^{s*}_{\lambda 0}(\varphi_h,\theta_h)\langle l0s\lambda|J\lambda\rangle,$$

where a_{Jlsm} are the coefficients of the fit

- Used AmpTools for PWA

- Meson Resonance (R) = $KK\pi$ system

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- Used AmpTools for PWA
- Meson Resonance (R) = $KK\pi$ system
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- Used PWA expression:

$$\sqrt{2l+1}\sqrt{2s+1}\,\frac{m_0\Gamma}{m_0{}^2 - m^2 - im_0\Gamma}\,a_{Jlsm}\sum_\lambda D^{J*}_{m\lambda}(\varphi_{GJ},\theta_{GJ})D^{s*}_{\lambda 0}(\varphi_h,\theta_h)\langle l0s\lambda|J\lambda\rangle,$$

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- Used AmpTools for PWA
- Meson Resonance (R) = $KK\pi$ system
- Decay modeled as $R\rightarrow$ Isobar π, where Isobar $\rightarrow K\,K$
- Coherently added amplitudes:
  -
  -

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- Used PWA expression:

$$\sqrt{2l+1}\sqrt{2s+1}\,\frac{m_0\Gamma}{m_0{}^2 - m^2 - im_0\Gamma}\,a_{Jlsm}\sum_\lambda D^{J*}_{m\lambda}(\varphi_{GJ},\theta_{GJ})D^{s*}_{\lambda 0}(\varphi_h,\theta_h)\langle l0s\lambda|J\lambda\rangle,$$

where a_{Jlsm} are the coefficients of the fit

- Used AmpTools for PWA
- Meson Resonance (R) = $KK\pi$ system
- Decay modeled as $R\rightarrow$ Isobar π, where Isobar $\rightarrow K\,K$
- Coherently added amplitudes:
  - $\eta(1295)\rightarrow a_0(980)\pi^0$ with $f_1(1285)\rightarrow a_0(980)\pi^0$
  -

Initial PWA setup

- Used PWA expression:

$$\sqrt{2l+1}\sqrt{2s+1}\,\frac{m_0\Gamma}{m_0{}^2 - m^2 - im_0\Gamma}\,a_{Jlsm}\sum_\lambda D^{J*}_{m\lambda}(\varphi_{GJ},\theta_{GJ})D^{s*}_{\lambda 0}(\varphi_h,\theta_h)\langle l0s\lambda|J\lambda\rangle,$$

where a_{Jlsm} are the coefficients of the fit

- Used AmpTools for PWA

- Meson Resonance (R) = $KK\pi$ system

- Decay modeled as $R\rightarrow$ Isobar π, where Isobar $\rightarrow K\,K$

- Coherently added amplitudes:
  - $\eta(1295)\rightarrow a_0(980)\pi^0$ with $f_1(1285)\rightarrow a_0(980)\pi^0$
  - $f_1(1285)\rightarrow K^+K^-\pi^0$ with $f_1(1420)\rightarrow K^+K^-\pi^0$

Initial PWA setup

- Used PWA expression:

$$\sqrt{2l+1}\sqrt{2s+1}\,\frac{m_0\Gamma}{m_0{}^2 - m^2 - im_0\Gamma}\,a_{Jlsm}\sum_\lambda D^{J*}_{m\lambda}(\varphi_{GJ},\theta_{GJ})D^{s*}_{\lambda 0}(\varphi_h,\theta_h)\langle l0s\lambda|J\lambda\rangle,$$

where a_{Jlsm} are the coefficients of the fit

- Used AmpTools for PWA
- Meson Resonance (R) = $KK\pi$ system
- Decay modeled as $R\rightarrow$ Isobar π, where Isobar $\rightarrow K\,K$
- Coherently added amplitudes:
  - $\eta(1295)\rightarrow a_0(980)\pi^0$ with $f_1(1285)\rightarrow a_0(980)\pi^0$
  - $f_1(1285)\rightarrow K^+K^-\pi^0$ with $f_1(1420)\rightarrow K^+K^-\pi^0$
- Initial fit was without $f_1(1420)$ and then added in after seeding with prior fit

Fit to full mass spectrum without $f_1(1420)$

```
MIGRAD FAILS TO FIND IMPROVEMENT
MACHINE ACCURACY LIMITS FURTHER IMPROVEMENT.
MIGRAD MINIMIZATION HAS CONVERGED.
FCN=-53090.6 FROM MIGRAD    STATUS=CONVERGED     1921        1922 TOTAL

                    EDM=0.00347163    STRATEGY= 1  ERROR MATRIX UNCERTAINTY     6 per cent
 EXT PARAMETER                                                STEP         FIRST
 NO.   NAME                           VALUE          ERROR        SIZE      DERIVATIVE
   1        kpkm_pi0::type1::eta_re      610.12        9.5275             0   -0.00046377
   2        kpkm_pi0::type1::eta_im      18.529        272.12            -0    0.00043666
   3   kpkm_pi0::type1::f1285a01_re     -7.5647        16.842            -0    -0.0003381
   4   kpkm_pi0::type1::f1285a01_im      5.1058        25.116             0   -0.00010373
   5   kpkm_pi0::type1::f1285a02_re      56.461        49.562            -0    0.00019438
   6   kpkm_pi0::type1::f1285a02_im     -100.49        35.878            -0   -3.0671e-05
   7   kpkm_pi0::type1::f1285a03_re      26.916        22.243            -0    0.00042992
   8   kpkm_pi0::type1::f1285a03_im     -9.6467        25.396            -0    4.5756e-05
   9 kpkm_pi0::type2::f1285kkpi1_re      39.868        49.281             0    4.9179e-05
  10 kpkm_pi0::type2::f1285kkpi1_im      71.079        30.156            -0    9.6164e-05
  11 kpkm_pi0::type2::f1285kkpi2_re      39.423        26.577            -0    1.9466e-05
  12 kpkm_pi0::type2::f1285kkpi2_im        20.7        26.295             0    7.4359e-06
  13 kpkm_pi0::type2::f1285kkpi3_re      159.41        32.913             0     0.0001478
  14 kpkm_pi0::type2::f1285kkpi3_im      59.022        46.458             0    0.00017745
  15 kpkm_pi0::type2::f1285kkpi4_re      39.373        38.718            -0   -3.6234e-06
  16 kpkm_pi0::type2::f1285kkpi4_im     -20.259        28.563             0    3.4162e-05
  17 kpkm_pi0::type2::f1285kkpi5_re      249.02         34.91             0     0.0001508
  18 kpkm_pi0::type2::f1285kkpi5_im      249.15        34.021            -0    0.00015835
  19 kpkm_pi0::type2::f1285kkpi6_re     -69.122         26.62             0    0.00017689
  20 kpkm_pi0::type2::f1285kkpi6_im      41.161        39.035            -0    0.00019135
  21 kpkm_pi0::type2::f1285kkpi7_re     -4.2499        34.388             0    6.1002e-05
  22 kpkm_pi0::type2::f1285kkpi7_im      1.7875        27.573            -0    0.00017009
  23 kpkm_pi0::type2::f1285kkpi8_re      24.478          26.2            -0    -7.791e-05
  24 kpkm_pi0::type2::f1285kkpi8_im     -3.5639        30.672            -0    6.0242e-06
  25 kpkm_pi0::type2::f1285kkpi9_re     -6.1073         27.84             0    0.00025916
  26 kpkm_pi0::type2::f1285kkpi9_im      15.337        35.481            -0     8.034e-07
```

Fit to full mass spectrum without $f_1(1420)$

```
MIGRAD FAILS TO FIND IMPROVEMENT
MACHINE ACCURACY LIMITS FURTHER IMPROVEMENT.
MIGRAD MINIMIZATION HAS CONVERGED.
FCN=-53090.6 FROM MIGRAD    STATUS=CONVERGED     1921         1922 TOTAL

                    EDM=0.00347163    STRATEGY= 1  ERROR MATRIX UNCERTAINTY     6 per cent
 EXT PARAMETER                                                 STEP         FIRST
 NO.   NAME                         VALUE            ERROR          SIZE      DERIVATIVE
   1        kpkm_pi0::type1::eta_re         610.12        9.5275            0   -0.00046377
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   3   kpkm_pi0::type1::f1285a01_re        -7.5647        16.842           -0    -0.0003381
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   8   kpkm_pi0::type1::f1285a03_im        -9.6467        25.396           -0    4.5756e-05
   9 kpkm_pi0::type2::f1285kkpi1_re         39.868        49.281            0    4.9179e-05
  10 kpkm_pi0::type2::f1285kkpi1_im         71.079        30.156           -0    9.6164e-05
  11 kpkm_pi0::type2::f1285kkpi2_re         39.423        26.577           -0    1.9466e-05
  12 kpkm_pi0::type2::f1285kkpi2_im           20.7        26.295            0    7.4359e-06
  13 kpkm_pi0::type2::f1285kkpi3_re         159.41        32.913            0     0.0001478
  14 kpkm_pi0::type2::f1285kkpi3_im         59.022        46.458            0    0.00017745
  15 kpkm_pi0::type2::f1285kkpi4_re         39.373        38.718           -0   -3.6234e-06
  16 kpkm_pi0::type2::f1285kkpi4_im        -20.259        28.563            0    3.4162e-05
  17 kpkm_pi0::type2::f1285kkpi5_re         249.02         34.91            0     0.0001508
  18 kpkm_pi0::type2::f1285kkpi5_im         249.15        34.021           -0    0.00015835
  19 kpkm_pi0::type2::f1285kkpi6_re        -69.122         26.62            0    0.00017689
  20 kpkm_pi0::type2::f1285kkpi6_im         41.161        39.035           -0    0.00019135
  21 kpkm_pi0::type2::f1285kkpi7_re        -4.2499        34.388            0    6.1002e-05
  22 kpkm_pi0::type2::f1285kkpi7_im         1.7875        27.573           -0    0.00017009
  23 kpkm_pi0::type2::f1285kkpi8_re         24.478          26.2           -0    -7.791e-05
  24 kpkm_pi0::type2::f1285kkpi8_im        -3.5639        30.672           -0    6.0242e-06
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  26 kpkm_pi0::type2::f1285kkpi9_im         15.337        35.481           -0     8.034e-07
```
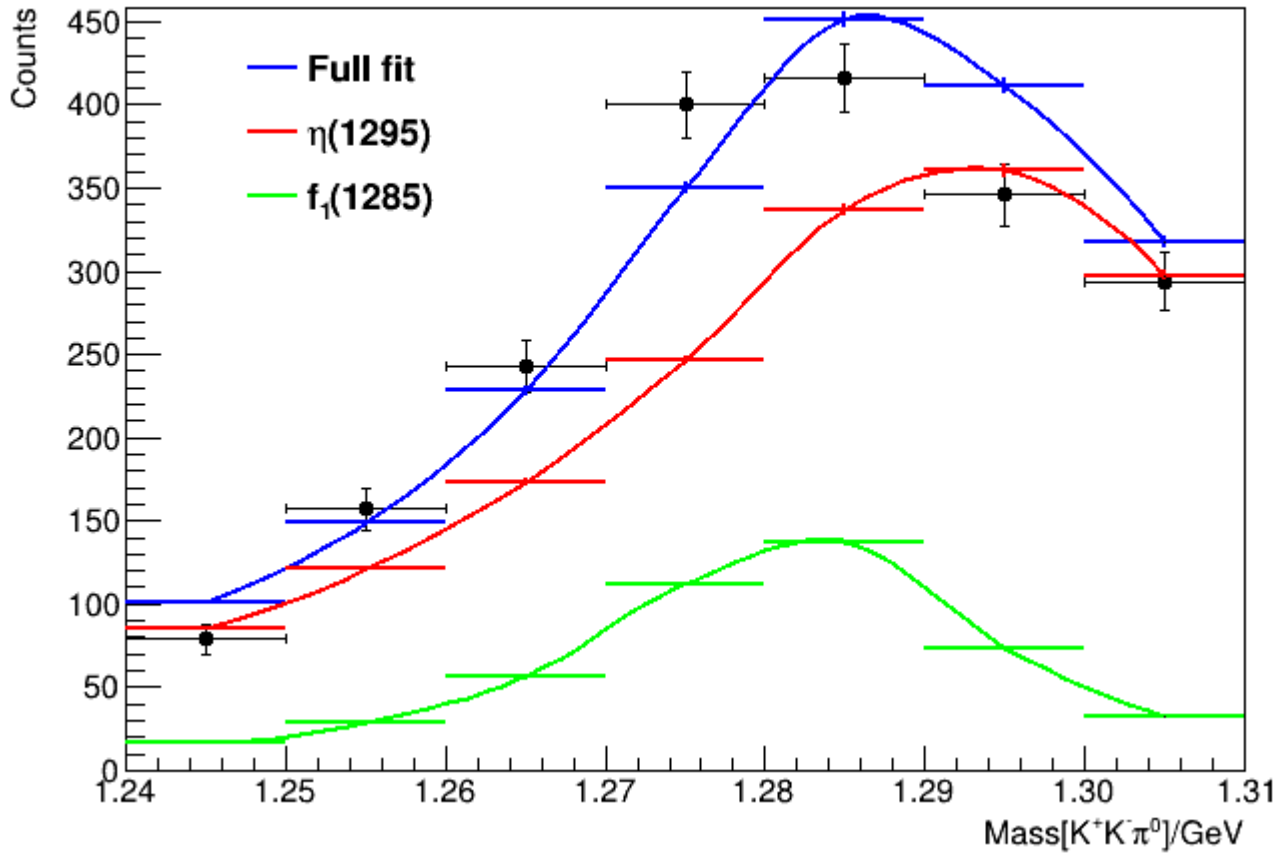

Fit to full mass spectrum without $f_1(1420)$



Fit to full mass spectrum without $f_1(1420)$

```
CALL LIMIT EXCEEDED IN MIGRAD.
MIGRAD TERMINATED WITHOUT CONVERGENCE.
FCN=-50130.5 FROM MIGRAD    STATUS=CALL LIMIT   5088        5089 TOTAL

                EDM=0.00109262    STRATEGY= 1  ERROR MATRIX UNCERTAINTY   0.6 per cent
 EXT PARAMETER                                APPROXIMATE        STEP         FIRST
 NO.   NAME                          VALUE          ERROR          SIZE      DERIVATIVE
   1        kpkm_pi0::type1::eta_re       560.59        18.821    -0.0062831   -4.4903e-05
   2        kpkm_pi0::type1::eta_im      -19.065        352.47      -0.16927    8.2023e-05
   3   kpkm_pi0::type1::f1285a01_re      -8.6825        27.416     0.0045114    2.5913e-06
   4   kpkm_pi0::type1::f1285a01_im      0.84603        25.271     0.0027337     0.0002221
   5   kpkm_pi0::type1::f1285a02_re       42.366        67.775     -0.032663    0.00047897
   6   kpkm_pi0::type1::f1285a02_im      -104.39        36.644     -0.012262   -7.2274e-05
   7   kpkm_pi0::type1::f1285a03_re       58.336         23.64     0.0042542    9.4383e-05
   8   kpkm_pi0::type1::f1285a03_im       1.1921        50.682     -0.020363    0.00028209
   9 kpkm_pi0::type2::f1285kkpi1_re       66.905        37.029     -0.0054819    1.9523e-05
  10 kpkm_pi0::type2::f1285kkpi1_im      -18.415        36.383     -0.0031096    0.00012876
  11 kpkm_pi0::type2::f1285kkpi2_re       127.27        42.603     0.0014164    7.6885e-05
  12 kpkm_pi0::type2::f1285kkpi2_im       35.518        30.485     -0.0021021   -4.2567e-05
  13 kpkm_pi0::type2::f1285kkpi3_re       190.39        32.261     -0.0036025   -5.5398e-06
  14 kpkm_pi0::type2::f1285kkpi3_im       179.56        31.519     -0.0002031    3.1636e-05
  15 kpkm_pi0::type2::f1285kkpi4_re       82.561        28.484     0.0014572     -0.0001541
  16 kpkm_pi0::type2::f1285kkpi4_im       16.452        30.579     -0.0011229    3.2981e-05
  17 kpkm_pi0::type2::f1285kkpi5_re       306.54        52.509     -0.0035749    2.3458e-05
  18 kpkm_pi0::type2::f1285kkpi5_im       224.64        49.446     -0.0042806   -0.00010236
  19 kpkm_pi0::type2::f1285kkpi6_re      -65.692        31.187     0.0027927    -0.00010071
  20 kpkm_pi0::type2::f1285kkpi6_im       40.884        33.942      0.004124    9.7697e-05
  21 kpkm_pi0::type2::f1285kkpi7_re       35.926        31.342     0.0040047    -4.7971e-05
  22 kpkm_pi0::type2::f1285kkpi7_im      -14.846        31.705    -0.00071615    3.1307e-05
  23 kpkm_pi0::type2::f1285kkpi8_re       6.5326        35.568     0.00065026    5.9079e-05
  24 kpkm_pi0::type2::f1285kkpi8_im      -29.875          28.4     -0.0034456   -5.1556e-05
  25 kpkm_pi0::type2::f1285kkpi9_re        2.438        30.047     -0.0049294    3.3174e-06
  26 kpkm_pi0::type2::f1285kkpi9_im      -68.414        34.058     -0.0013662   -6.6831e-05
  27 kpkm_pi0::type2::f1420kkpi1_re      -157.78        118.43         0.0103   -4.7203e-06
  28 kpkm_pi0::type2::f1420kkpi1_im       403.38        123.89      0.030109    -3.5475e-06
  29 kpkm_pi0::type2::f1420kkpi2_re      -92.456        122.84     -0.010251    1.6867e-05
  30 kpkm_pi0::type2::f1420kkpi2_im      -505.71        119.43    -8.7056e-05    1.4374e-05
  31 kpkm_pi0::type2::f1420kkpi3_re       159.03        116.88     0.0051625          6e-05
  32 kpkm_pi0::type2::f1420kkpi3_im      -299.06        181.29      0.019342    1.1531e-05
  33 kpkm_pi0::type2::f1420kkpi4_re      -34.148        122.17     -0.016635    3.7981e-06
  34 kpkm_pi0::type2::f1420kkpi4_im      -429.47        101.97     -0.0011294   -2.4481e-05
  35 kpkm_pi0::type2::f1420kkpi5_re      -65.075        198.59     0.0010457    2.6726e-05
  36 kpkm_pi0::type2::f1420kkpi5_im      -83.677        233.73      0.019463    1.5351e-05
  37 kpkm_pi0::type2::f1420kkpi6_re       85.722        123.84      0.008431   -2.3697e-05
  38 kpkm_pi0::type2::f1420kkpi6_im       42.078        130.99     -0.018063    -4.9814e-06
  39 kpkm_pi0::type2::f1420kkpi7_re      -57.302         128.7     -0.0052733    8.1952e-06
  40 kpkm_pi0::type2::f1420kkpi7_im      -19.544        102.33     -0.013993    -1.0824e-05
  41 kpkm_pi0::type2::f1420kkpi8_re      -55.686        103.93     0.0010231    -1.2424e-05
  42 kpkm_pi0::type2::f1420kkpi8_im       129.74        125.79    -0.00047498    3.0965e-05
  43 kpkm_pi0::type2::f1420kkpi9_re      -244.61        113.21     -0.0022586   -2.2316e-05
  44 kpkm_pi0::type2::f1420kkpi9_im       24.935        108.42      0.022864    1.1494e-05
```

Fit to full mass spectrum without $f_1(1420)$

```
CALL LIMIT EXCEEDED IN MIGRAD.
MIGRAD TERMINATED WITHOUT CONVERGENCE.
FCN=-50130.5 FROM MIGRAD    STATUS=CALL LIMIT   5088       5089 TOTAL

                EDM=0.00109262    STRATEGY= 1  ERROR MATRIX UNCERTAINTY   0.6 per cent
 EXT PARAMETER                                APPROXIMATE        STEP         FIRST
 NO.   NAME                          VALUE          ERROR          SIZE      DERIVATIVE
   1        kpkm_pi0::type1::eta_re       560.59        18.821   -0.0062831   -4.4903e-05
   2        kpkm_pi0::type1::eta_im      -19.065        352.47     -0.16927    8.2023e-05
   3   kpkm_pi0::type1::f1285a01_re      -8.6825        27.416    0.0045114    2.5913e-06
   4   kpkm_pi0::type1::f1285a01_im      0.84603        25.271    0.0027337     0.0002221
   5   kpkm_pi0::type1::f1285a02_re       42.366        67.775    -0.032663    0.00047897
   6   kpkm_pi0::type1::f1285a02_im      -104.39        36.644    -0.012262   -7.2274e-05
   7   kpkm_pi0::type1::f1285a03_re       58.336         23.64    0.0042542    9.4383e-05
   8   kpkm_pi0::type1::f1285a03_im       1.1921        50.682    -0.020363    0.00028209
   9 kpkm_pi0::type2::f1285kkpi1_re       66.905        37.029    -0.0054819    1.9523e-05
  10 kpkm_pi0::type2::f1285kkpi1_im      -18.415        36.383    -0.0031096    0.00012876
  11 kpkm_pi0::type2::f1285kkpi2_re       127.27        42.603    0.0014164    7.6885e-05
  12 kpkm_pi0::type2::f1285kkpi2_im       35.518        30.485    -0.0021021   -4.2567e-05
  13 kpkm_pi0::type2::f1285kkpi3_re       190.39        32.261    -0.0036025   -5.5398e-06
  14 kpkm_pi0::type2::f1285kkpi3_im       179.56        31.519    -0.0002031    3.1636e-05
  15 kpkm_pi0::type2::f1285kkpi4_re       82.561        28.484    0.0014572    -0.0001541
  16 kpkm_pi0::type2::f1285kkpi4_im       16.452        30.579    -0.0011229    3.2981e-05
  17 kpkm_pi0::type2::f1285kkpi5_re       306.54        52.509    -0.0035749    2.3458e-05
  18 kpkm_pi0::type2::f1285kkpi5_im       224.64        49.446    -0.0042806   -0.00010236
  19 kpkm_pi0::type2::f1285kkpi6_re      -65.692        31.187    0.0027927    -0.00010071
  20 kpkm_pi0::type2::f1285kkpi6_im       40.884        33.942     0.004124    9.7697e-05
  21 kpkm_pi0::type2::f1285kkpi7_re       35.926        31.342    0.0040047    -4.7971e-05
  22 kpkm_pi0::type2::f1285kkpi7_im      -14.846        31.705   -0.00071615    3.1307e-05
  23 kpkm_pi0::type2::f1285kkpi8_re       6.5326        35.568    0.00065026    5.9079e-05
  24 kpkm_pi0::type2::f1285kkpi8_im      -29.875          28.4    -0.0034456    -5.1556e-05
  25 kpkm_pi0::type2::f1285kkpi9_re        2.438        30.047    -0.0049294    3.3174e-06
  26 kpkm_pi0::type2::f1285kkpi9_im      -68.414        34.058    -0.0013662    -6.6831e-05
  27 kpkm_pi0::type2::f1420kkpi1_re      -157.78        118.43        0.0103    -4.7203e-06
  28 kpkm_pi0::type2::f1420kkpi1_im       403.38        123.89      0.030109    -3.5475e-06
  29 kpkm_pi0::type2::f1420kkpi2_re      -92.456        122.84     -0.010251    1.6867e-05
  30 kpkm_pi0::type2::f1420kkpi2_im      -505.71        119.43    -8.7056e-05    1.4374e-05
  31 kpkm_pi0::type2::f1420kkpi3_re       159.03        116.88     0.0051625          6e-05
  32 kpkm_pi0::type2::f1420kkpi3_im      -299.06        181.29      0.019342    1.1531e-05
  33 kpkm_pi0::type2::f1420kkpi4_re      -34.148        122.17     -0.016635    3.7981e-06
  34 kpkm_pi0::type2::f1420kkpi4_im      -429.47        101.97     -0.0011294   -2.4481e-05
  35 kpkm_pi0::type2::f1420kkpi5_re      -65.075        198.59     0.0010457    2.6726e-05
  36 kpkm_pi0::type2::f1420kkpi5_im      -83.677        233.73      0.019463    1.5351e-05
  37 kpkm_pi0::type2::f1420kkpi6_re       85.722        123.84      0.008431    -2.3697e-05
  38 kpkm_pi0::type2::f1420kkpi6_im       42.078        130.99     -0.018063    -4.9814e-06
  39 kpkm_pi0::type2::f1420kkpi7_re      -57.302         128.7     -0.0052733    8.1952e-06
  40 kpkm_pi0::type2::f1420kkpi7_im      -19.544        102.33     -0.013993    -1.0824e-05
  41 kpkm_pi0::type2::f1420kkpi8_re      -55.686        103.93     0.0010231    -1.2424e-05
  42 kpkm_pi0::type2::f1420kkpi8_im       129.74        125.79    -0.00047498    3.0965e-05
  43 kpkm_pi0::type2::f1420kkpi9_re      -244.61        113.21     -0.0022586    -2.2316e-05
  44 kpkm_pi0::type2::f1420kkpi9_im       24.935        108.42      0.022864    1.1494e-05
```

Fit to full mass spectrum without $f_1(1420)$

```
CALL LIMIT EXCEEDED IN MIGRAD.
MIGRAD TERMINATED WITHOUT CONVERGENCE.
FCN=-50130.5 FROM MIGRAD    STATUS=CALL LIMIT   5088       5089 TOTAL

                EDM=0.00109262    STRATEGY= 1  ERROR MATRIX UNCERTAINTY   0.6 per cent
 EXT PARAMETER                                APPROXIMATE        STEP         FIRST
 NO.   NAME                          VALUE          ERROR          SIZE      DERIVATIVE
   1        kpkm_pi0::type1::eta_re       560.59        18.821   -0.0062831   -4.4903e-05
   2        kpkm_pi0::type1::eta_im      -19.065        352.47     -0.16927    8.2023e-05
   3   kpkm_pi0::type1::f1285a01_re      -8.6825        27.416    0.0045114    2.5913e-06
   4   kpkm_pi0::type1::f1285a01_im      0.84603        25.271    0.0027337     0.0002221
   5   kpkm_pi0::type1::f1285a02_re       42.366        67.775    -0.032663    0.00047897
   6   kpkm_pi0::type1::f1285a02_im      -104.39        36.644    -0.012262   -7.2274e-05
   7   kpkm_pi0::type1::f1285a03_re       58.336         23.64    0.0042542    9.4383e-05
   8   kpkm_pi0::type1::f1285a03_im       1.1921        50.682    -0.020363    0.00028209
   9 kpkm_pi0::type2::f1285kkpi1_re       66.905        37.029    -0.0054819    1.9523e-05
  10 kpkm_pi0::type2::f1285kkpi1_im      -18.415        36.383    -0.0031096    0.00012876
  11 kpkm_pi0::type2::f1285kkpi2_re       127.27        42.603     0.0014164    7.6885e-05
  12 kpkm_pi0::type2::f1285kkpi2_im       35.518        30.485    -0.0021021   -4.2567e-05
  13 kpkm_pi0::type2::f1285kkpi3_re       190.39        32.261    -0.0036025   -5.5398e-06
  14 kpkm_pi0::type2::f1285kkpi3_im       179.56        31.519    -0.0002031    3.1636e-05
  15 kpkm_pi0::type2::f1285kkpi4_re       82.561        28.484     0.0014572    -0.0001541
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  20 kpkm_pi0::type2::f1285kkpi6_im       40.884        33.942      0.004124    9.7697e-05
  21 kpkm_pi0::type2::f1285kkpi7_re       35.926        31.342     0.0040047   -4.7971e-05
  22 kpkm_pi0::type2::f1285kkpi7_im      -14.846        31.705   -0.00071615    3.1307e-05
  23 kpkm_pi0::type2::f1285kkpi8_re       6.5326        35.568    0.00065026    5.9079e-05
  24 kpkm_pi0::type2::f1285kkpi8_im      -29.875          28.4    -0.0034456   -5.1556e-05
  25 kpkm_pi0::type2::f1285kkpi9_re        2.438        30.047    -0.0049294    3.3174e-06
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  27 kpkm_pi0::type2::f1420kkpi1_re      -157.78        118.43        0.0103   -4.7203e-06
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  29 kpkm_pi0::type2::f1420kkpi2_re      -92.456        122.84     -0.010251    1.6867e-05
  30 kpkm_pi0::type2::f1420kkpi2_im      -505.71        119.43    -8.7056e-05    1.4374e-05
  31 kpkm_pi0::type2::f1420kkpi3_re       159.03        116.88     0.0051625          6e-05
  32 kpkm_pi0::type2::f1420kkpi3_im      -299.06        181.29      0.019342    1.1531e-05
  33 kpkm_pi0::type2::f1420kkpi4_re      -34.148        122.17     -0.016635    3.7981e-06
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  35 kpkm_pi0::type2::f1420kkpi5_re      -65.075        198.59     0.0010457    2.6726e-05
  36 kpkm_pi0::type2::f1420kkpi5_im      -83.677        233.73      0.019463    1.5351e-05
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  42 kpkm_pi0::type2::f1420kkpi8_im       129.74        125.79    -0.00047498    3.0965e-05
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  44 kpkm_pi0::type2::f1420kkpi9_im       24.935        108.42      0.022864    1.1494e-05
```
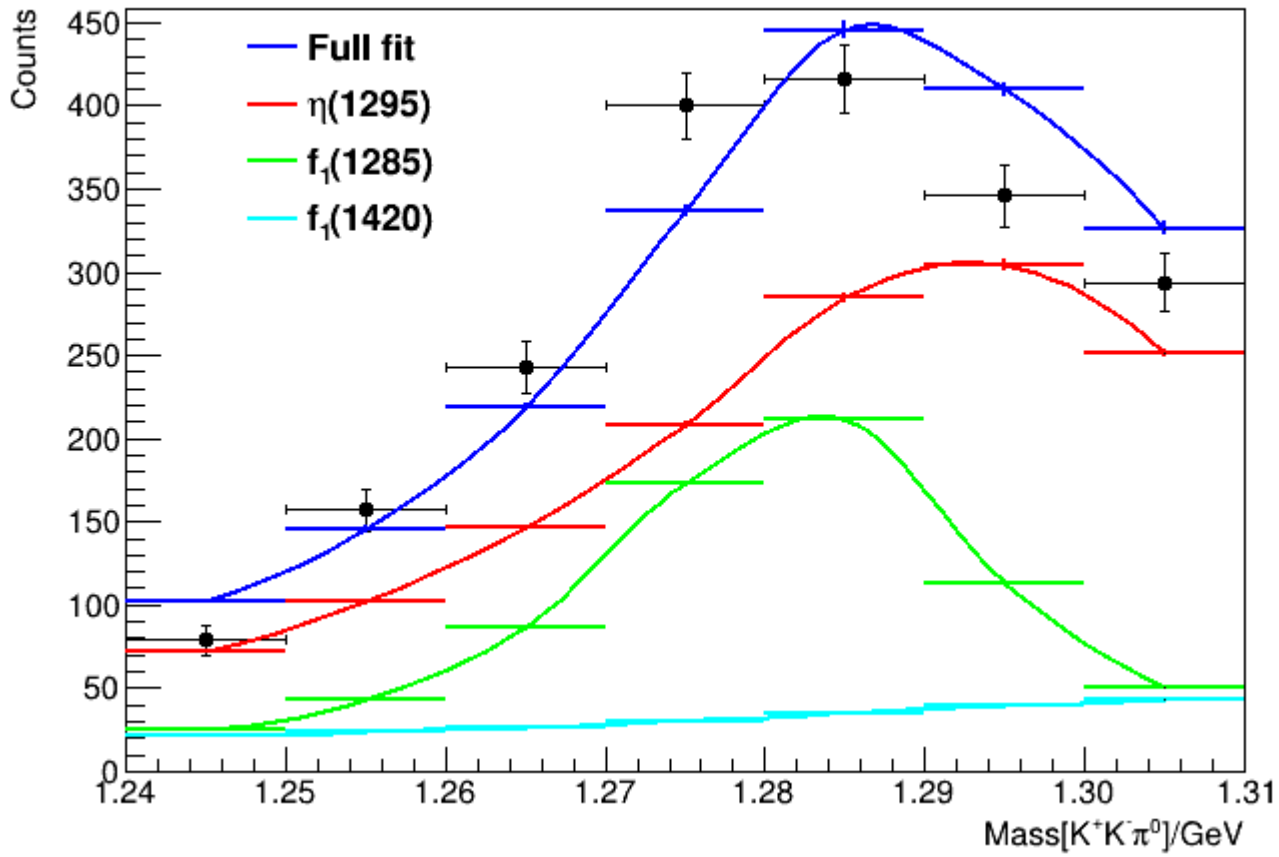

How do I increase the call limit in AmpTools?

Fit to full mass spectrum with $f_1(1420)$



Current situation and next step

- It is plausible that the low mass spectrum of $K^+K^-\pi^0$ can be well modelled with $\eta(1295)$, $f_1(1285)$ and $f_1(1420)$
-

Current situation and next step

- It is plausible that the low mass spectrum of $K^+K^-\pi^0$ can be well modelled with $\eta(1295)$, $f_1(1285)$ and $f_1(1420)$
- Next step: Go back and fit mass-bin by mass-bin and extract the mass dependent shapes of the fixed-J distributions

Title