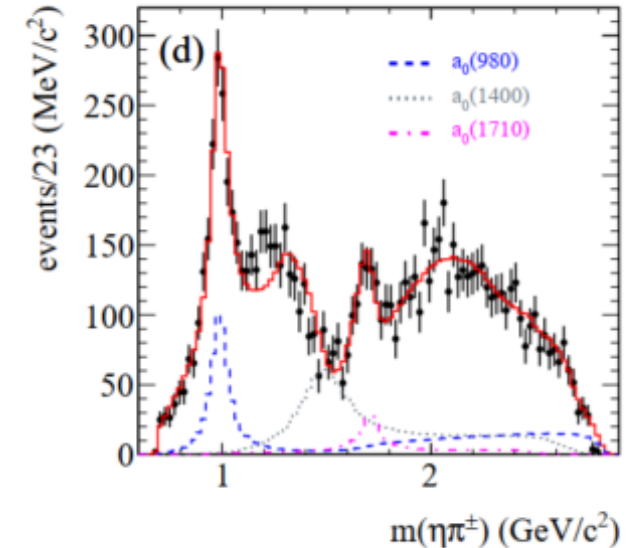
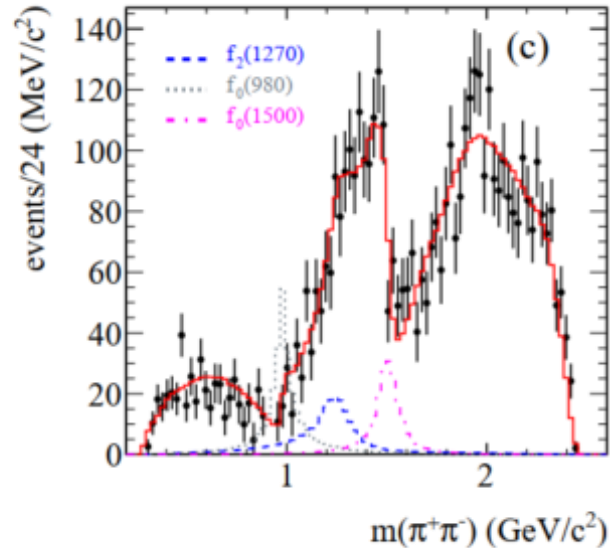
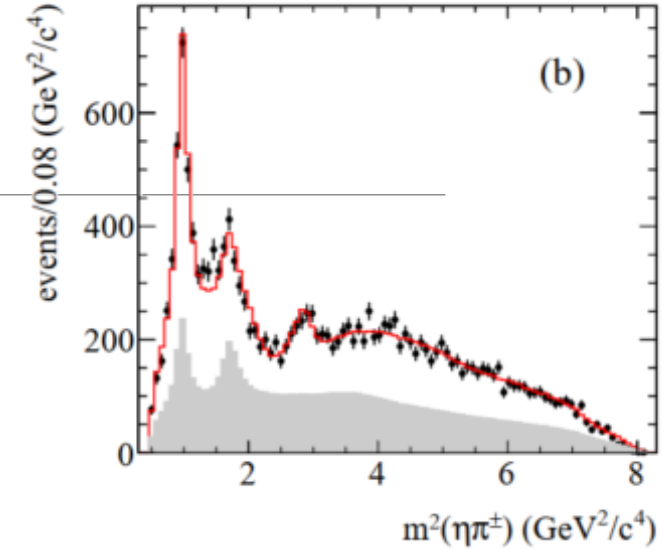
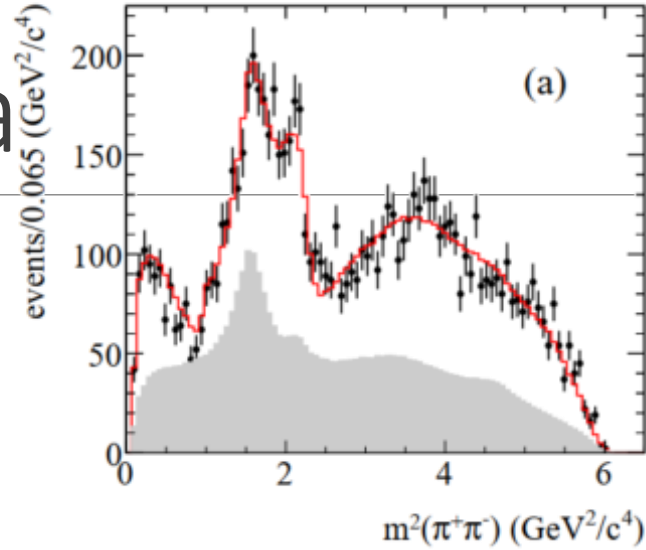


Eta_c -> pi+ pi- eta

TABLE VII: Fractions and relative phases from the Dalitz plot analysis of $\eta_c \rightarrow \eta \pi^+ \pi^-$. The first errors are statistical, the second systematic.

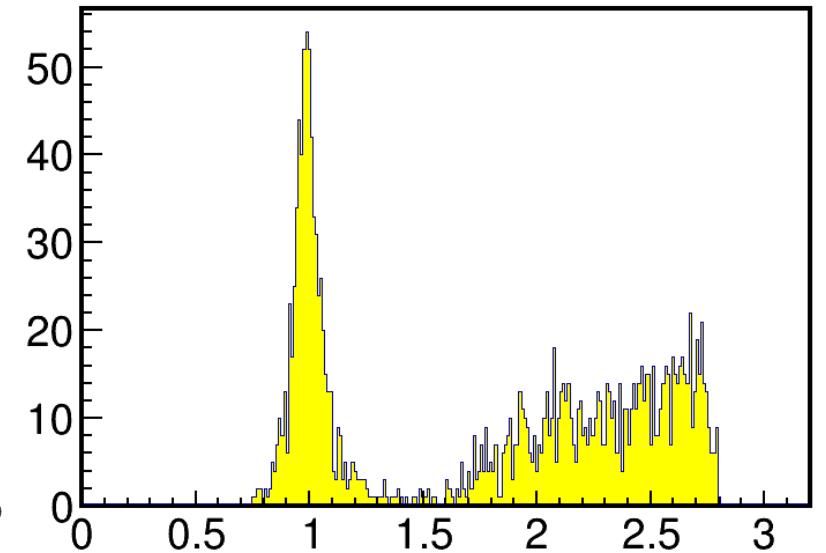
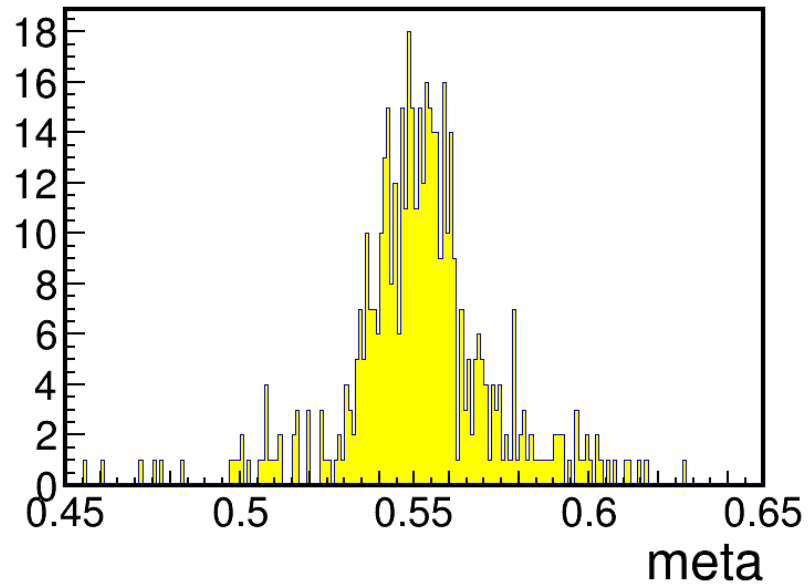
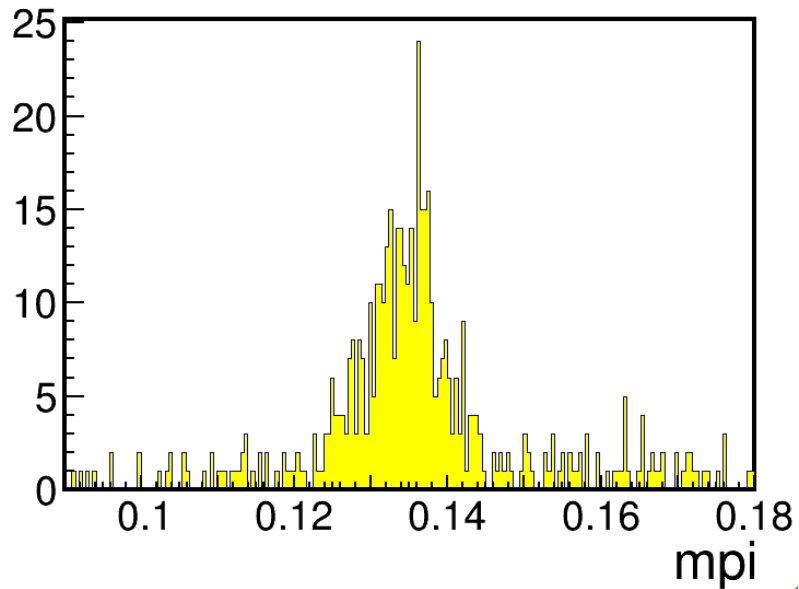
Intermediate state	fraction (%)	phase (rad)
$a_0(980)^+ \pi^-$	$12.3 \pm 1.2 \pm 2.8$	0.
$a_2(1310)^+ \pi^-$	$2.5 \pm 0.7 \pm 0.9$	$-1.04 \pm 0.13 \pm 0.20$
$f_0(500)\eta$	$4.3 \pm 1.3 \pm 1.1$	$0.54 \pm 0.14 \pm 0.24$
$f_2(1270)\eta$	$4.6 \pm 0.9 \pm 0.8$	$-1.15 \pm 0.11 \pm 0.05$
$f_0(980)\eta$	$5.7 \pm 1.3 \pm 1.5$	$-2.41 \pm 0.09 \pm 0.07$
$f_0(1500)\eta$	$4.2 \pm 0.7 \pm 0.9$	$2.32 \pm 0.13 \pm 0.17$
$a_0(1450)^+ \pi^-$	$15.0 \pm 2.4 \pm 3.2$	$2.60 \pm 0.09 \pm 0.11$
$a_0(1700)^+ \pi^-$	$3.5 \pm 0.8 \pm 0.8$	$1.39 \pm 0.15 \pm 0.20$
$f_2(1950)\eta$	$4.2 \pm 1.0 \pm 1.0$	$-1.59 \pm 0.15 \pm 0.21$
resonant sum	$56.3 \pm 3.7 \pm 10.0$	
NR	$172.7 \pm 8.0 \pm 10.0$	$1.67 \pm 0.07 \pm 0.06$
sum	$229.0 \pm 8.8 \pm 14.1$	
χ^2/ndf	419/382=1.1	
p -value	9.3%	



The radiative photon has low energy – potential peaking bkg can't be estimated by sideband

Confirmed by Eta_c \rightarrow pi0 a0 exclusive MC

Need to confirm the contribution



J/psi -> gamma eta_c (pi0 pi0 eta) sample

Event Selection

Similar to J/psi -> gamma eta pi0

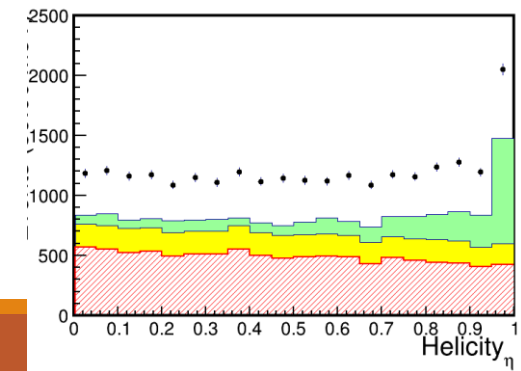
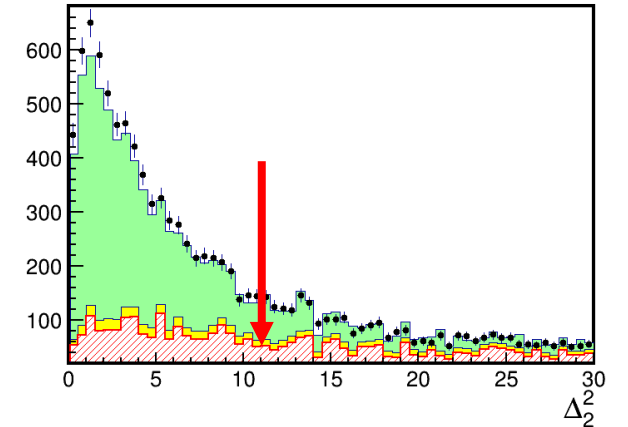
At least 7 photon candidates

5C fit constraining the mass of eta_c

Minimizing $\Delta_1^2 = \frac{(m_{12}-m_\pi)^2}{\sigma_\pi^2} + \frac{(m_{34}-m_\pi)^2}{\sigma_\pi^2} + \frac{(m_{56}-m_\eta)^2}{\sigma_\eta^2}$ to determine photon assignment

Define $\Delta_2^2 = \frac{(m_{12}-m_\pi)^2}{\sigma_\pi^2} + \frac{(m_{34}-m_\pi)^2}{\sigma_\pi^2} + \frac{(m_{56}-m_\pi)^2}{\sigma_\pi^2}$ to veto J/psi -> gamma 3pi0 bkg

$\Delta_2^2 > 11$; eta asymmetry < 0.95



J/psi -> gamma eta_c (pi0 pi0 eta) sample

Round05 data; Consistent with pi+ pi- eta decay

Estimated bkg number with 10B data around a0: 110 (10%)

