



JAGIELLONIAN UNIVERSITY
IN KRAKOW



Study of the $NN\eta'$ production with COSY-11

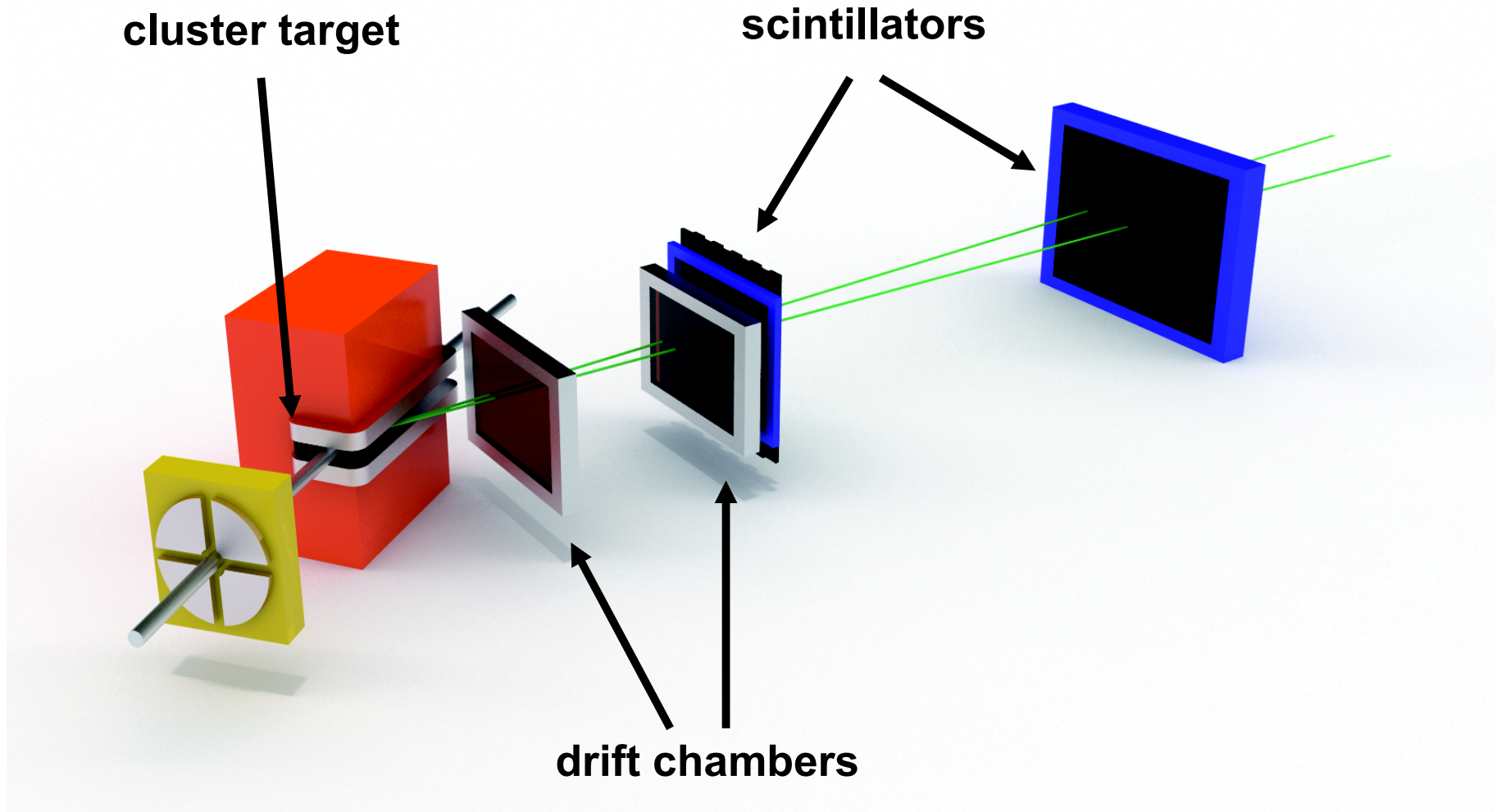
Eryk Czerwiński

2nd International Symposium on Mesic Nuclei
Cracow, 24.09.2013

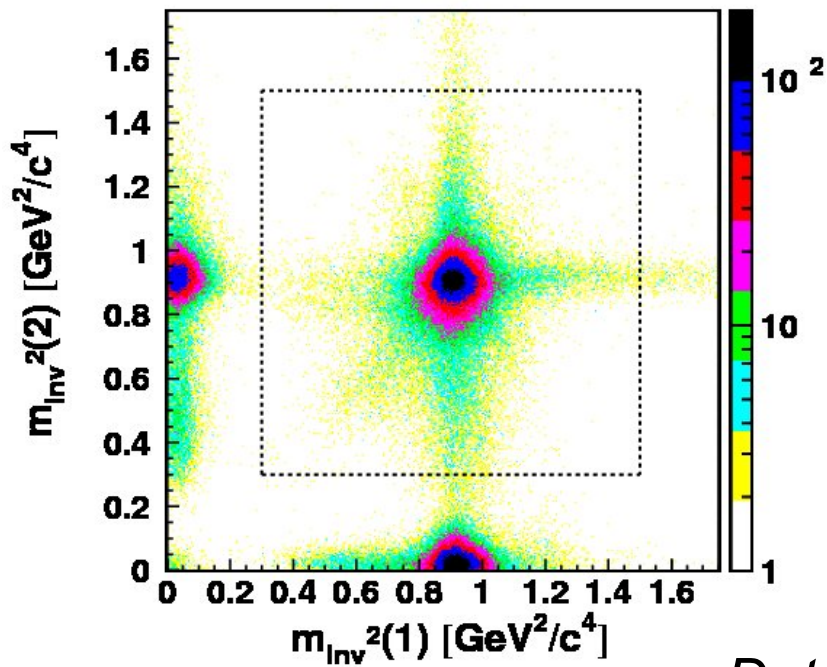
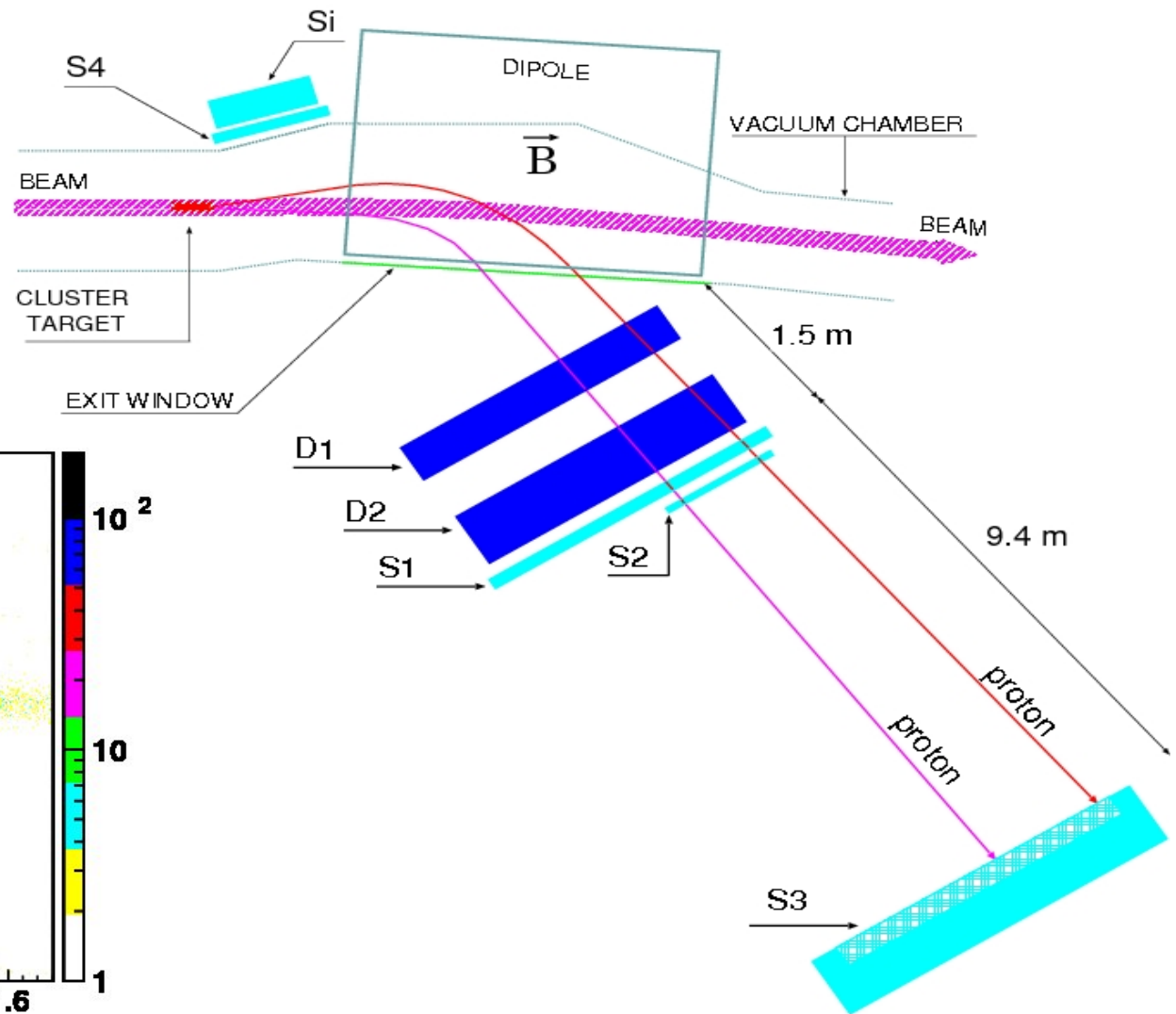
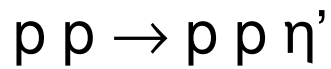
Motivation

- η' production cross-sections
 - pp FSI
 - $N\eta'$ interaction
 - η' mesic nuclei

COSY-11 setup

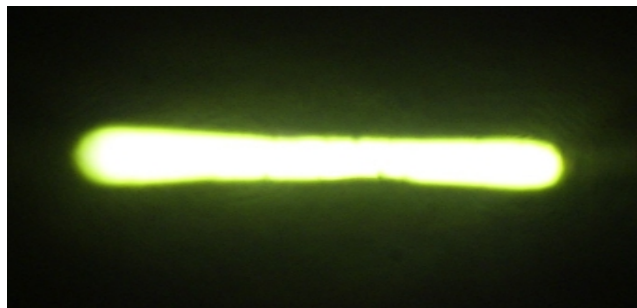
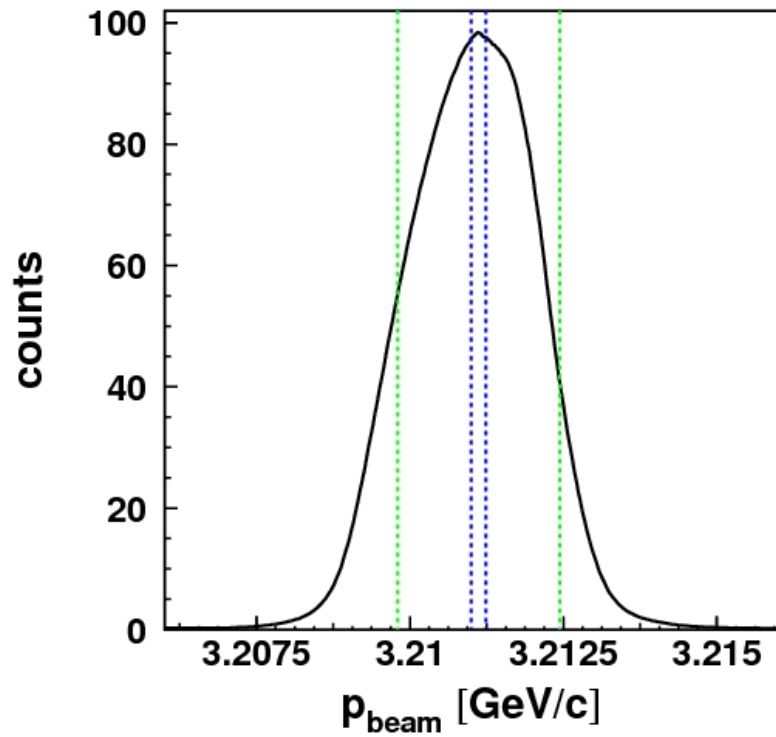


Principle of measurement

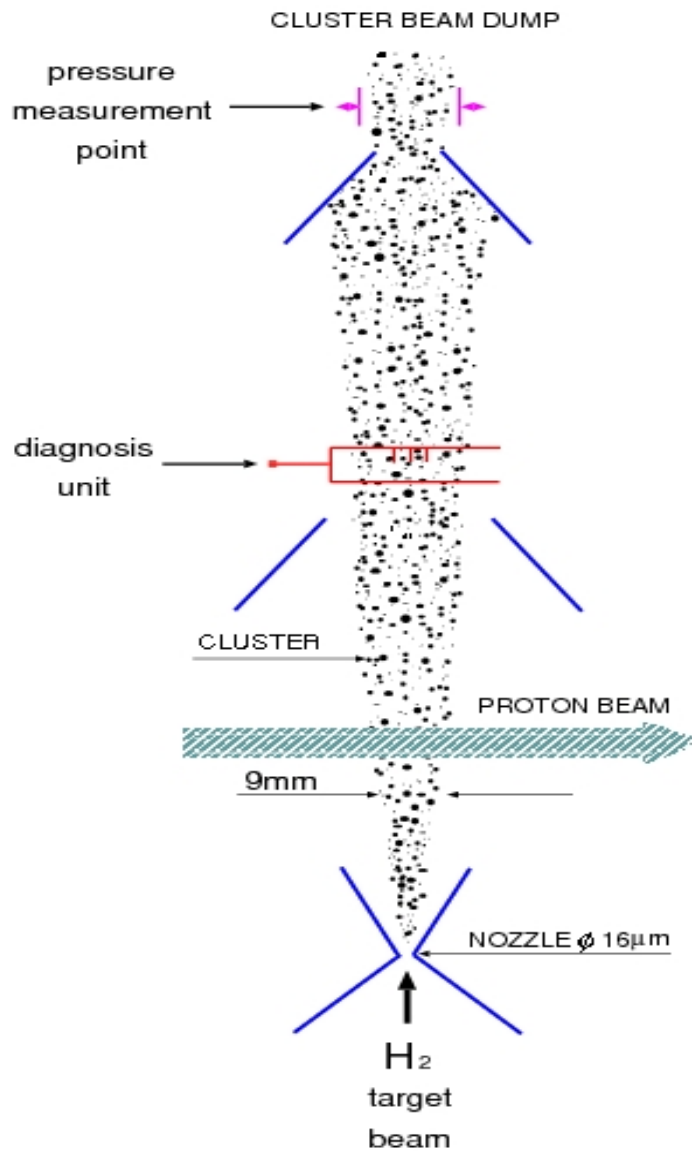


Determination of the total width of the η' meson
 COSY-11 : Phys.Rev.Lett. 105 (2010) 122001

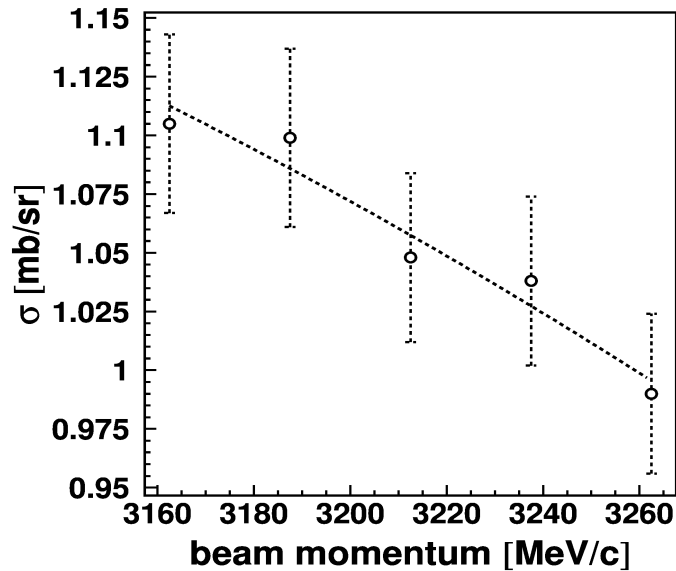
Detector system upgrade



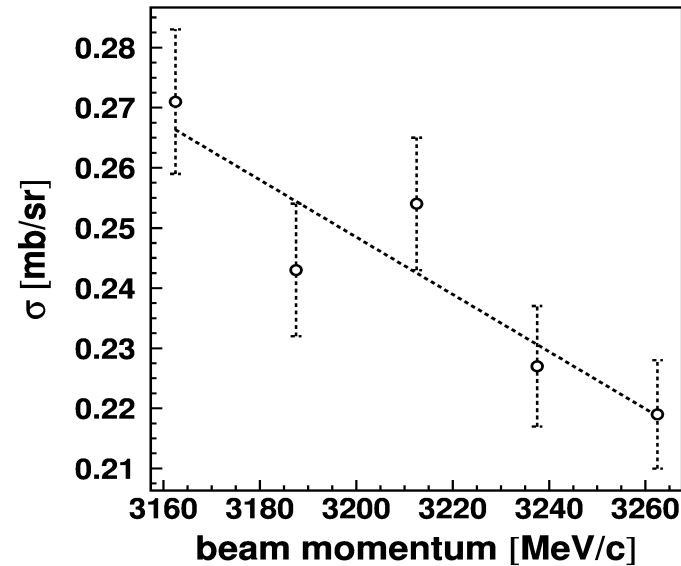
Detector system upgrade



Luminosity determination



angle CM 41deg



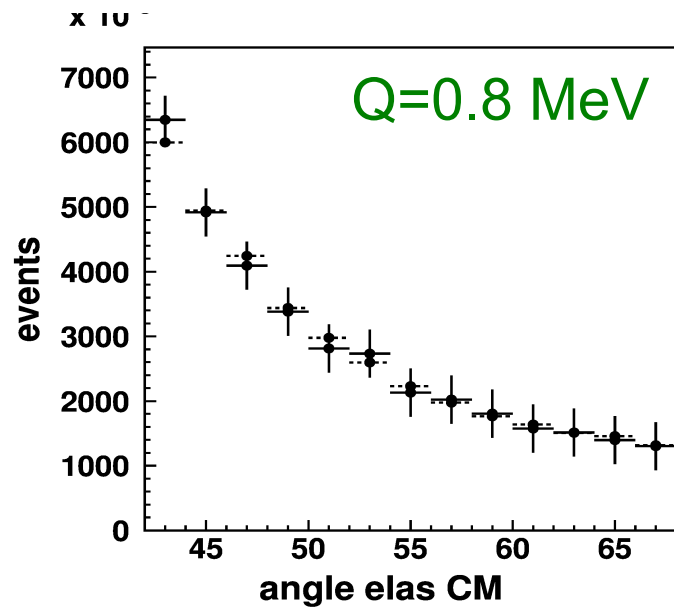
angle CM 59deg

points
EDDA data
pp→pp

line
2nd order
polynomial
fit

Comparison with differential cross-section
for elastically scattered pp from EDDA collaboration
Eur. Phys. J. A 22, 125 (2004)
Phys. Rev. Lett. 78, 1652 (1997)

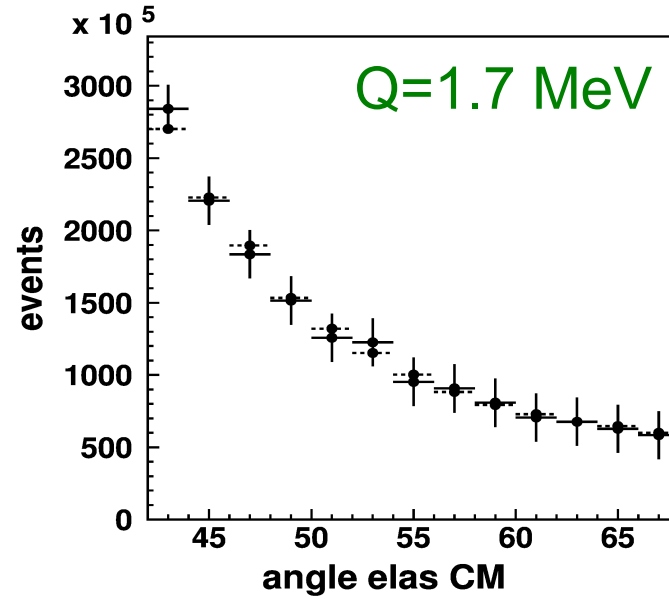
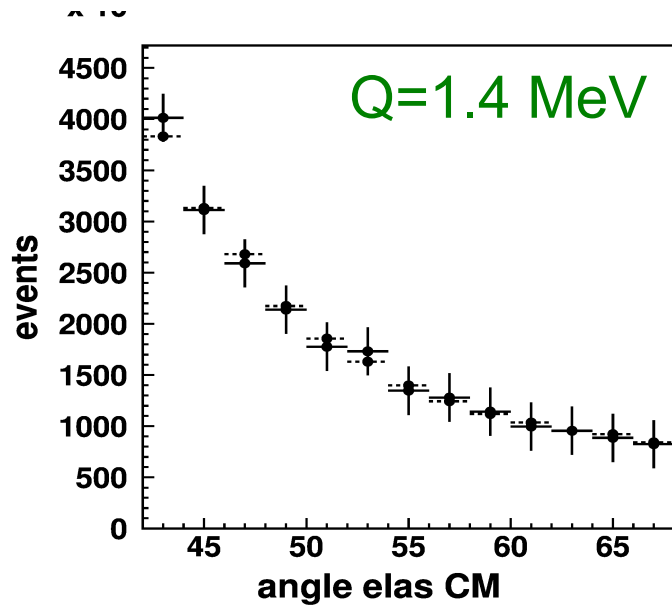
Luminosity determination



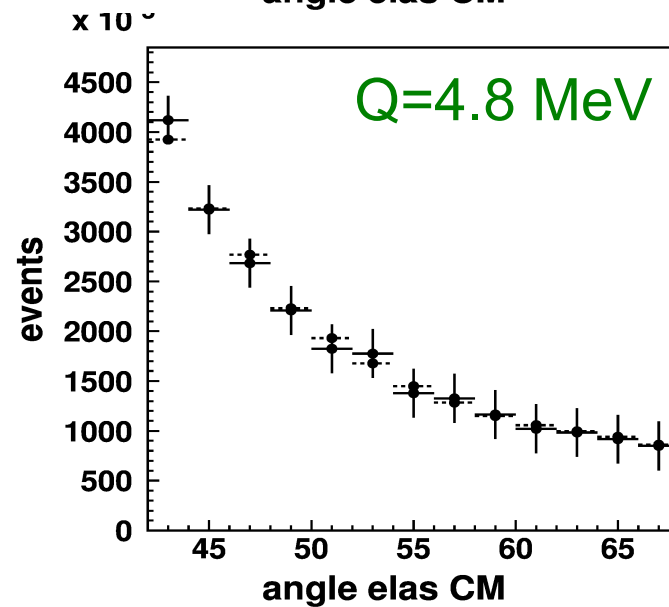
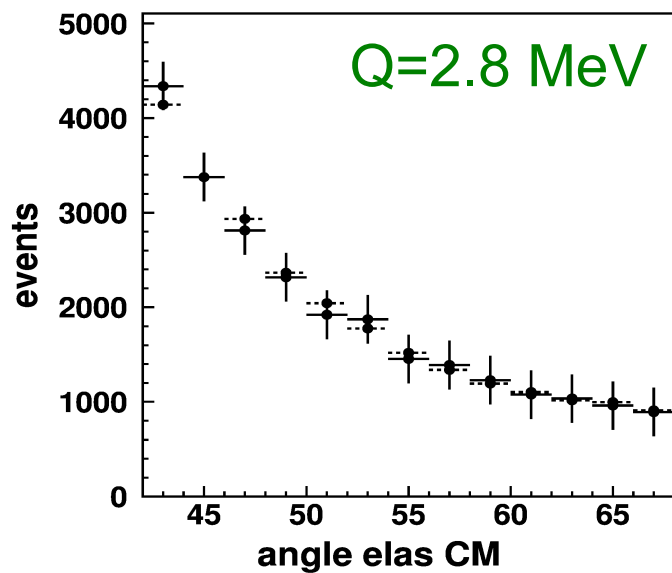
— EDDA
- - - COSY-11
pp → pp

Comparison with differential cross-section
for elastically scattered pp from EDDA collaboration
Eur. Phys. J. A 22, 125 (2004)
Phys. Rev. Lett. 78, 1652 (1997)

Luminosity determination



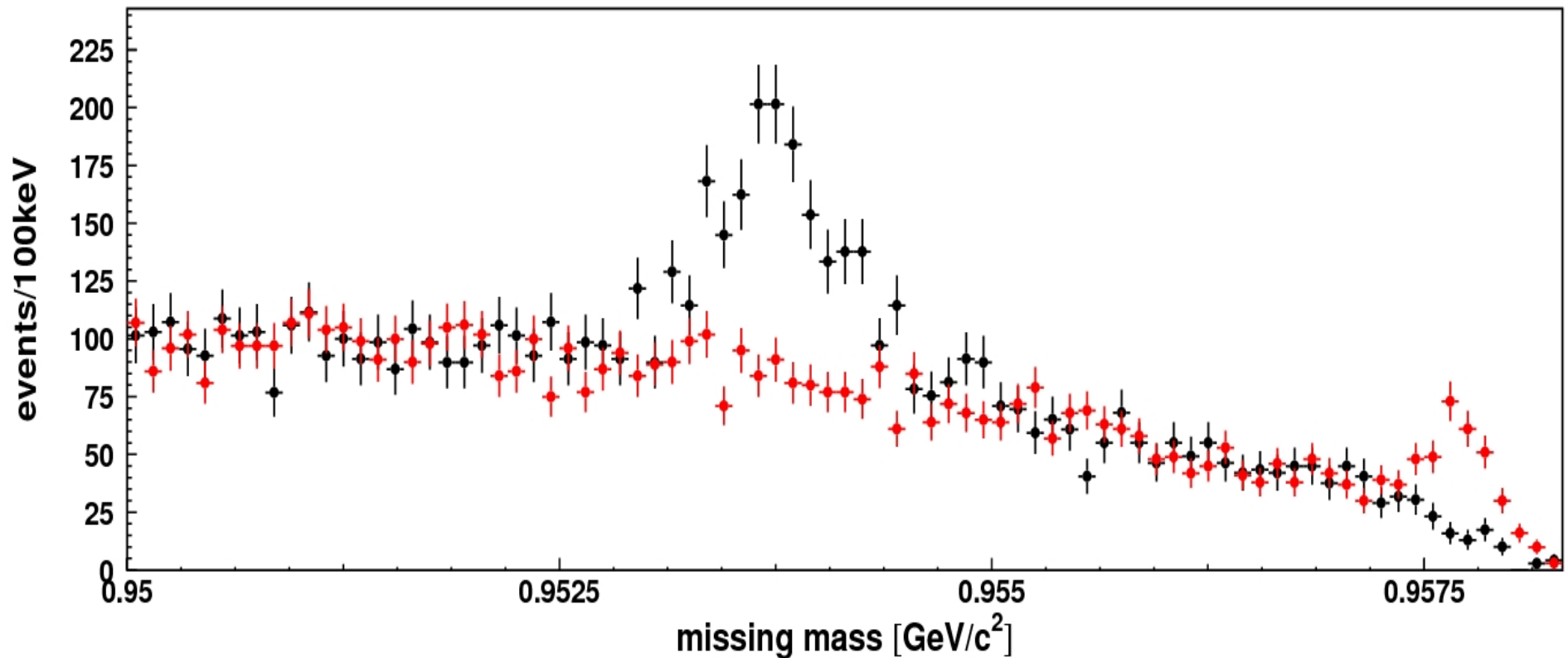
— EDDA
- - - COSY-11
 $pp \rightarrow pp$



Background subtraction

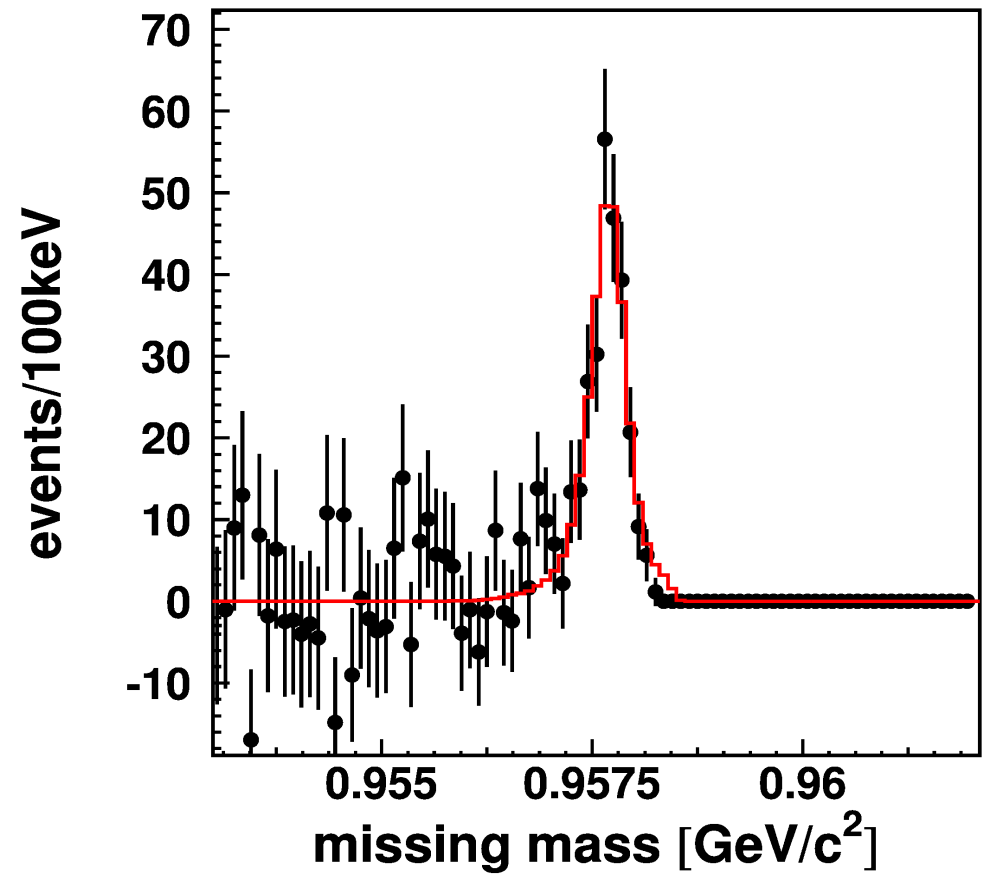
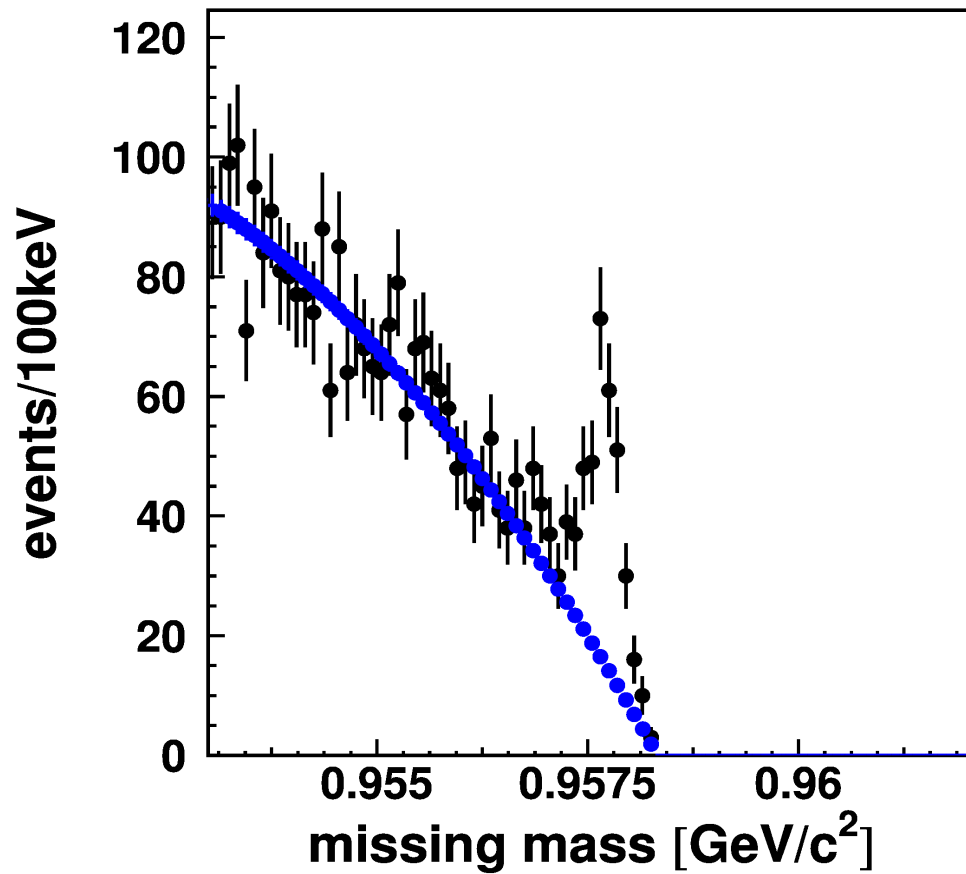
Q = 0.8 MeV data

Q = 4.8 MeV data shifted and normalized to Q = 0.8 MeV data



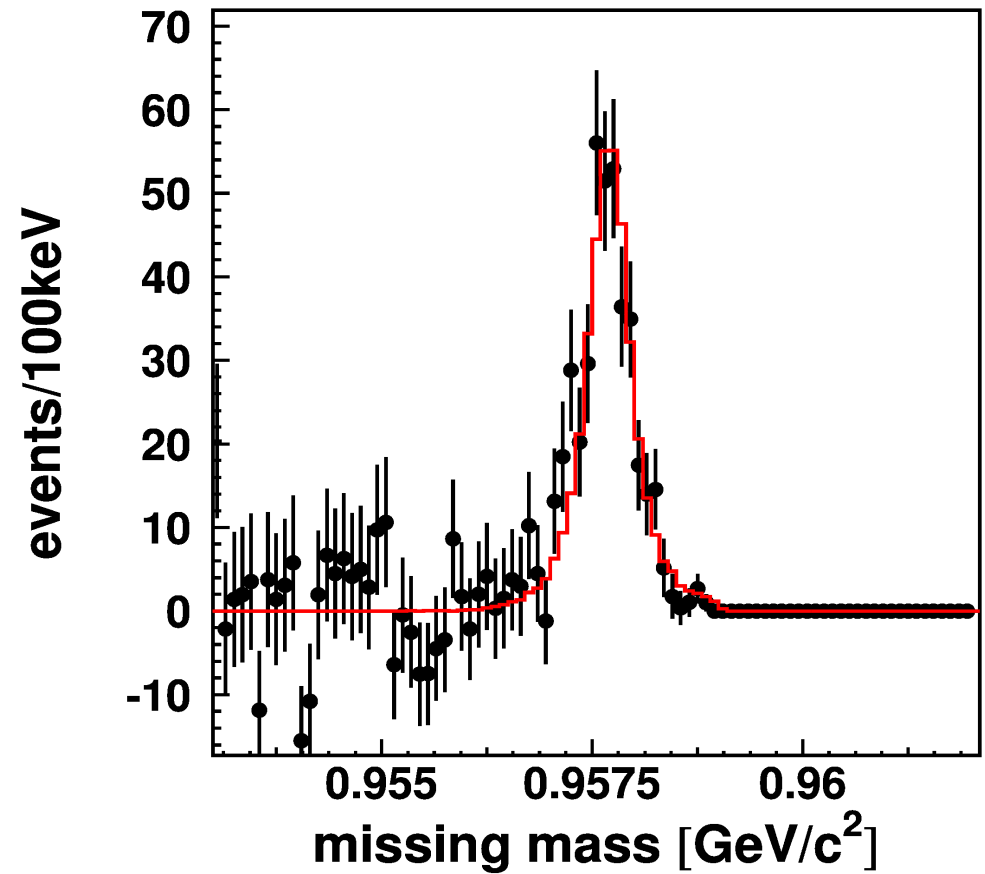
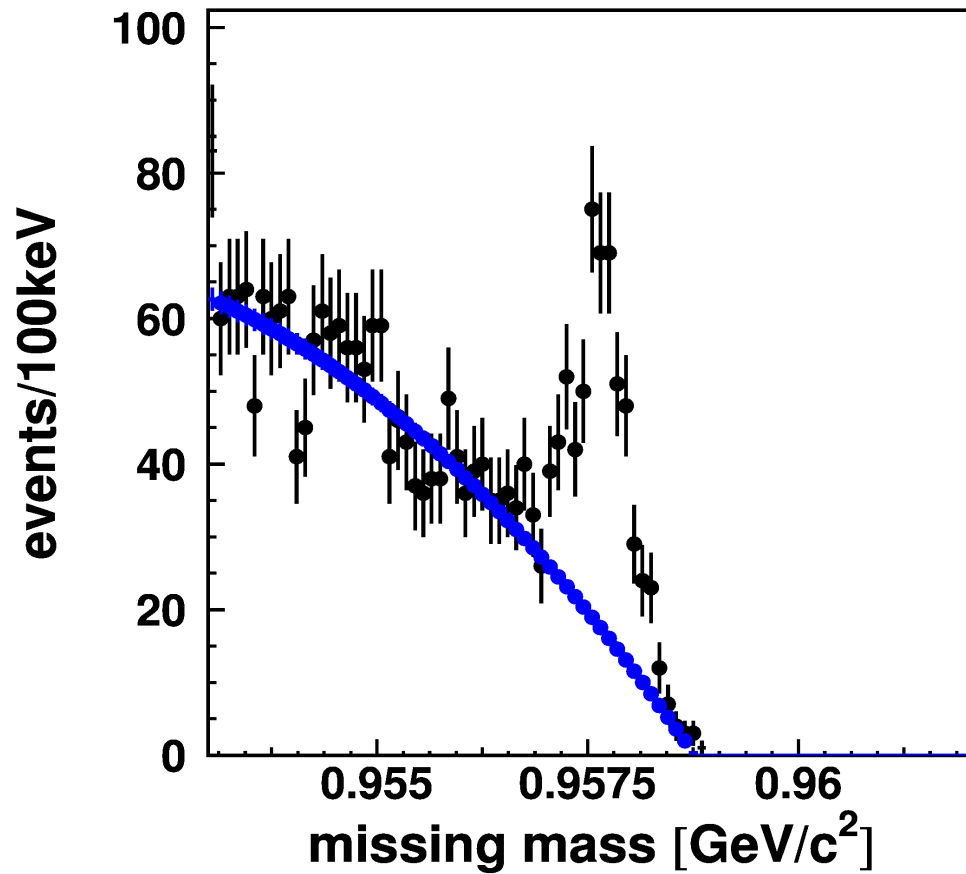
η' counting

Q=0.8 MeV



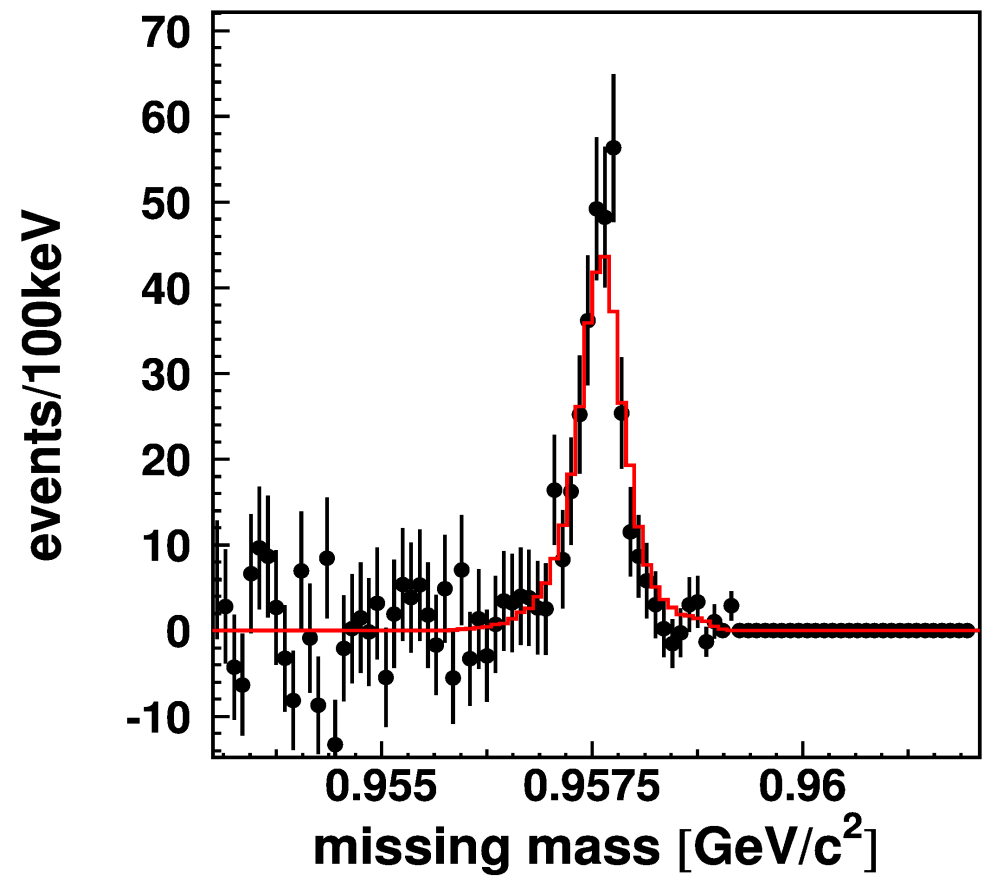
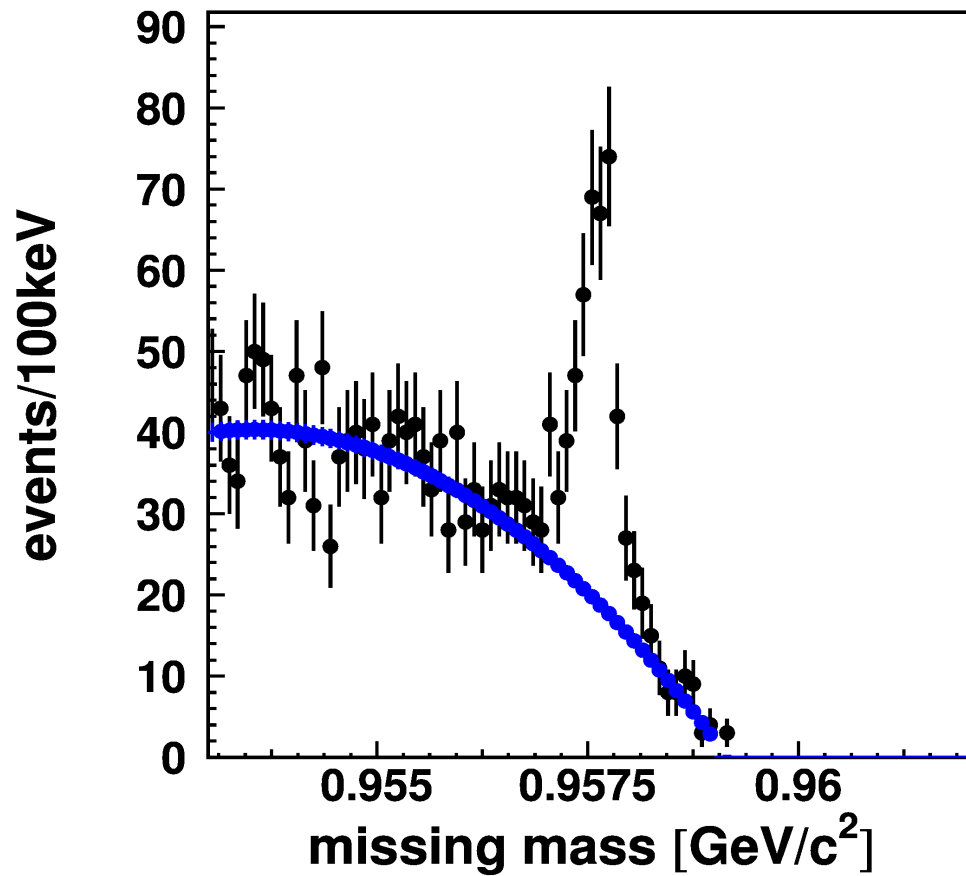
η' counting

Q=1.4 MeV



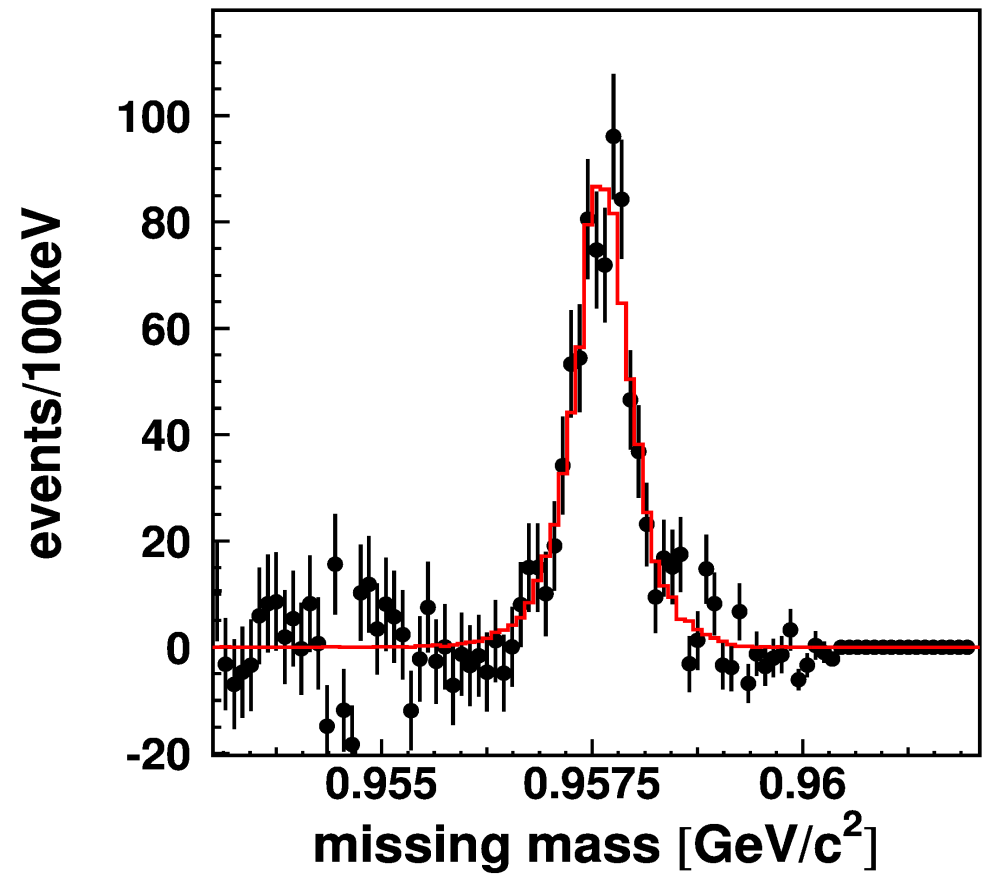
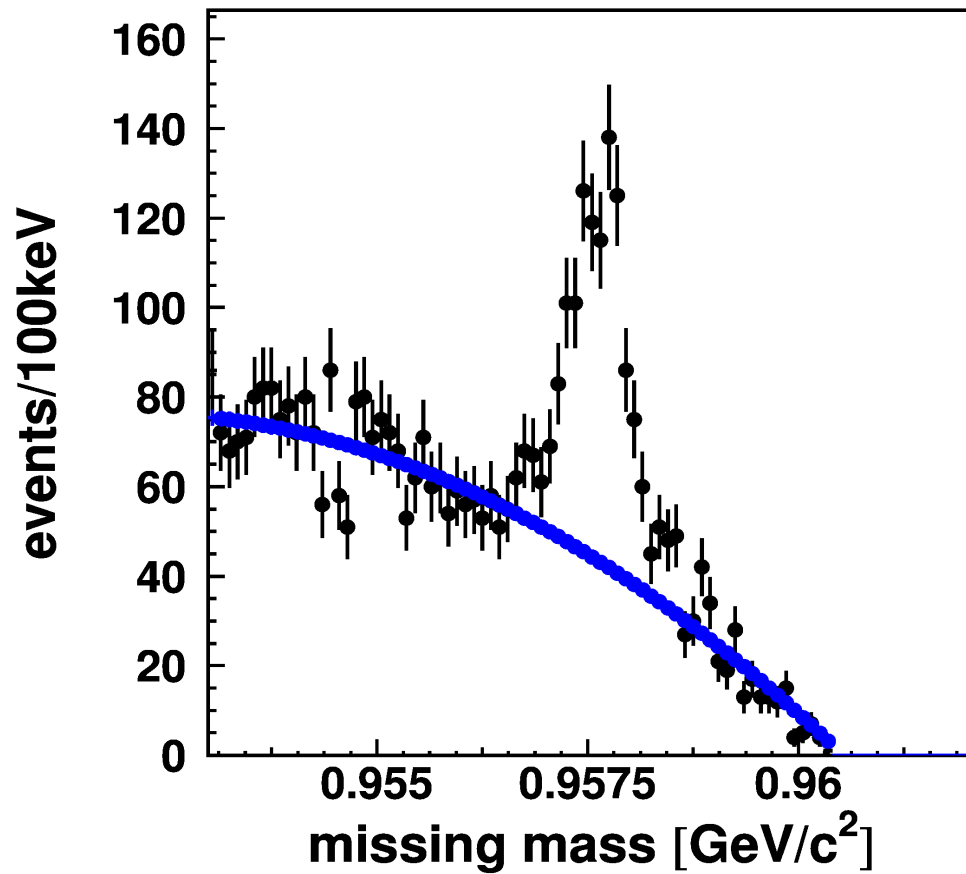
η' counting

Q=1.7 MeV



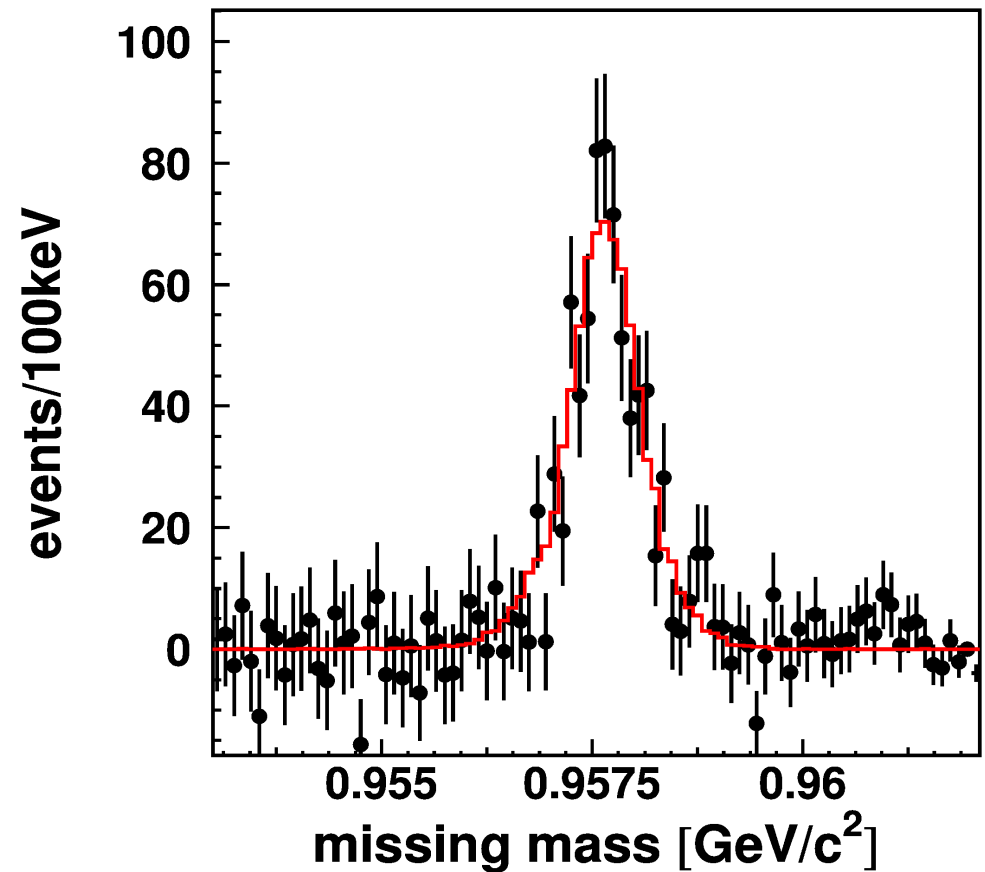
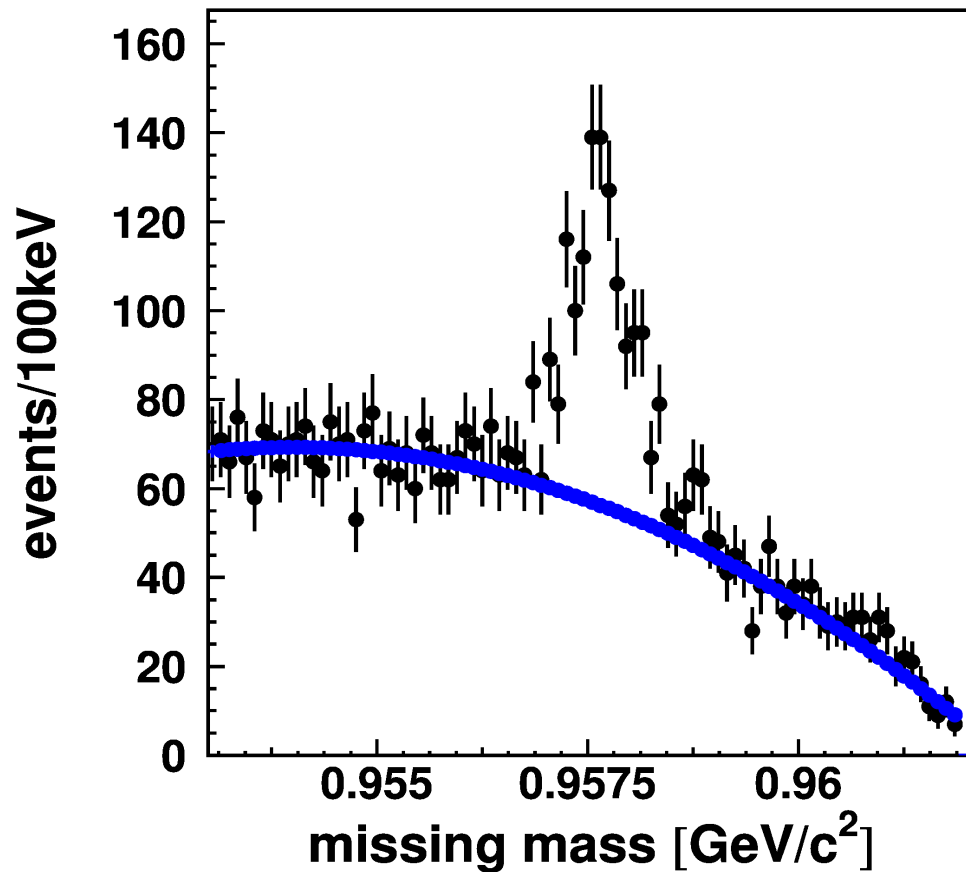
η' counting

Q=2.8 MeV

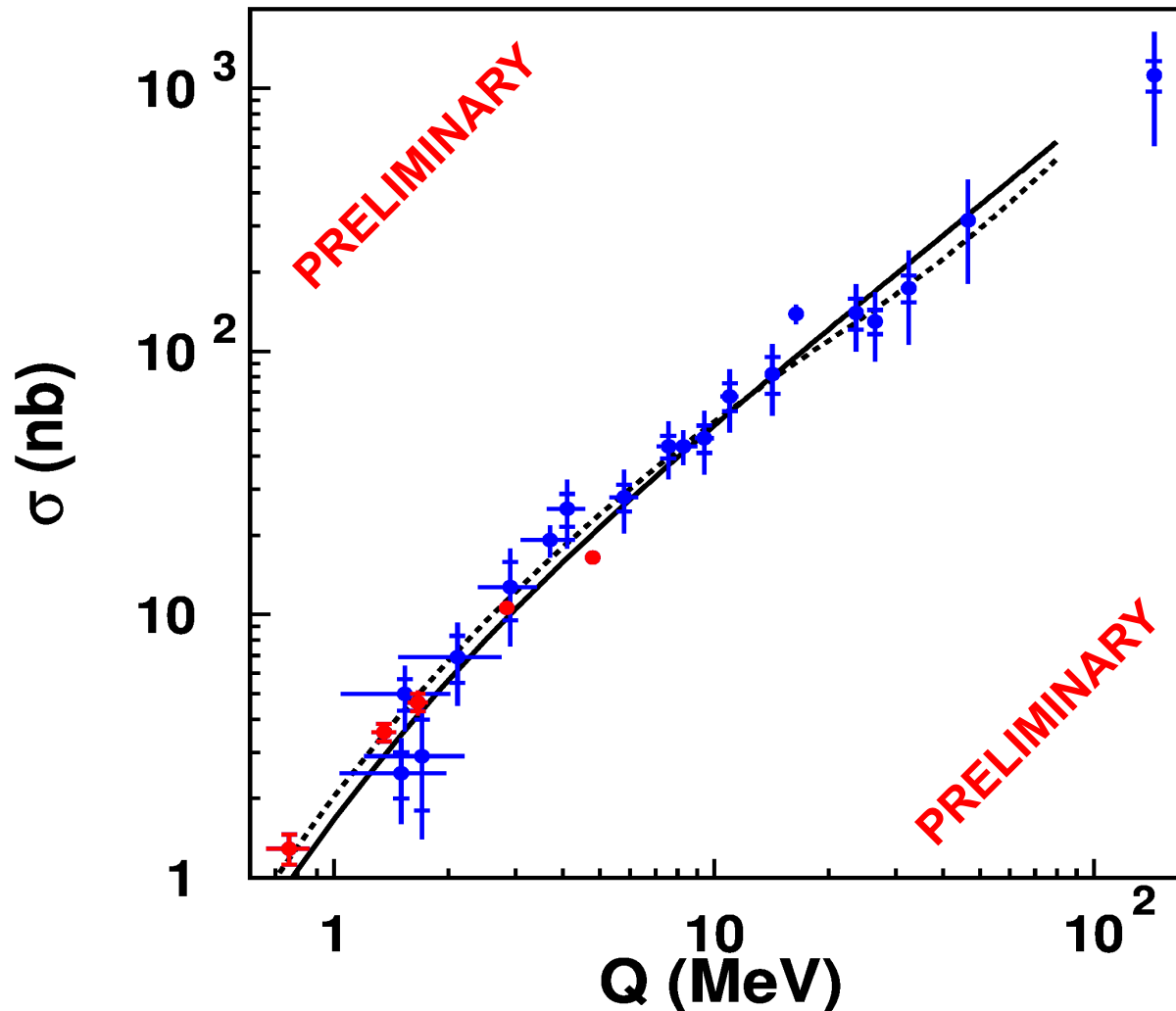


η' counting

Q=4.8 MeV



Result and plans



DATA

COSY-11

Phys. Rev. Lett. 80 (1998) 3202

Phys. Lett. B 474 (2000) 416

Eur. Phys. J. A 20 (2004) 345–350

Phys.Lett. B684 (2010) 11-16

SPESIII

Phys. Lett. B 438 (1998) 41

DISTO

Phys. Lett. B 491 (2000) 29

COSY-11 preliminary

THEORY (pp FSI only)

based on Cini-Fubini-Stanghellini

Nucl. Phys. A 278 (1977) 506

Phys. Rev. C 4 (1971) 995

Ann. Rev. Nucl. Sci. 22 (1972) 465

B. L. Druzhinin, A. E. Kudryavtsev,

V. E. Tarasov,

Z. Phys. A 359 (1997), 205

Thank you for attention.