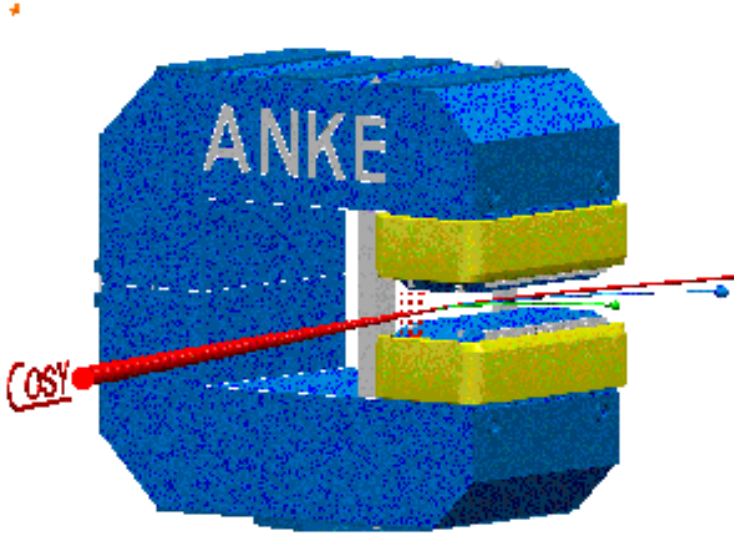
ω- meson production in pn collisions

Y.Maeda (FZ-Juelich), for ANKE collaboration

- Physics motivation
  - pn→dω
  - pp→ppω
- Experiment
  - pn→dω
- Preliminary spectra
- Summary

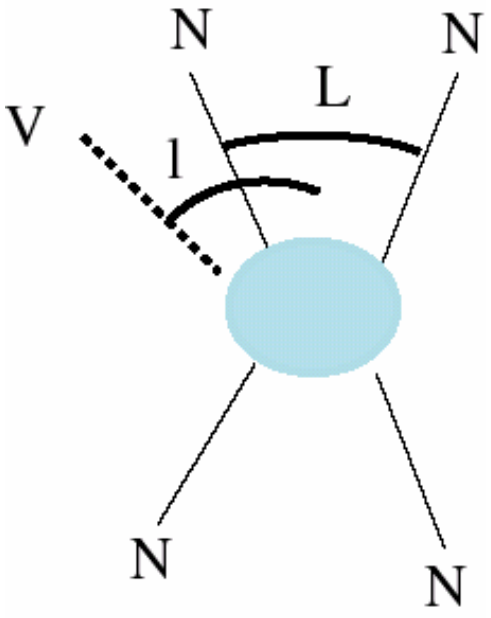


ω meson production in pN collisions close to threshold

$$\sigma_{tot}(pp \to ppV) = \sigma_T,$$

$$\sigma_{tot}(pn \to pnV) = (\sigma_T + \sigma_S)/2,$$

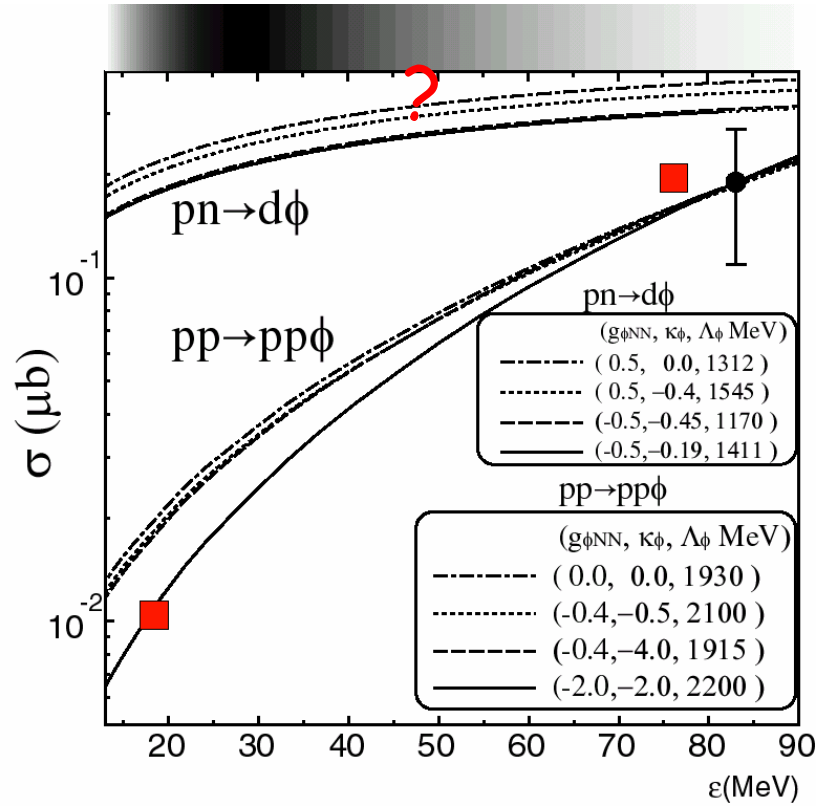
$$\sigma_{tot}(pn \to dV) = \sigma_S^d/2.$$



Ll	σ_T	σ_S
Ss	${}^3P_1 \to {}^1S_0\ s$	${}^1P_1 \to {}^3S_1\ s$
Sp	${}^1D_2 \to {}^1S_0\ p$	${}^3S_1 \to {}^3S_1\ p$
Ps	${}^1S_0 \to {}^3P_1\ s$	${}^3S_1 \to {}^1P_1\ s$

The reaction pn→dω

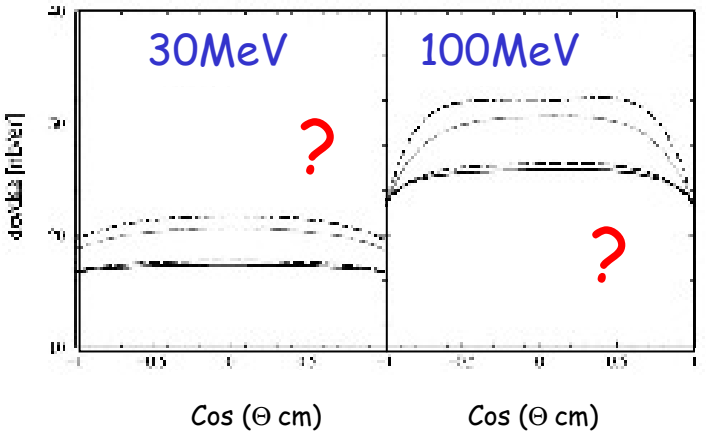
$$\sigma_{tot}(pp \to pp\phi) = \sigma_T,$$
$$\sigma_{tot}(pn \to pn\phi) = (\sigma_T + \sigma_S)/2,$$
$$\sigma_{tot}(pn \to d\phi) = \sigma_S^d/2.$$



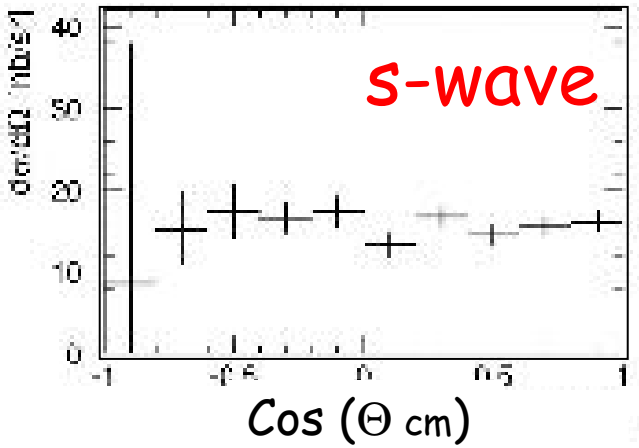
K.Tsushima and K.Nakayama, Phys.Rev.C68(2003)034612

K.Nakayama,J.Haidenbauer,J.Speth, Phys. Rev. C63,(2000)015201

pn→dω

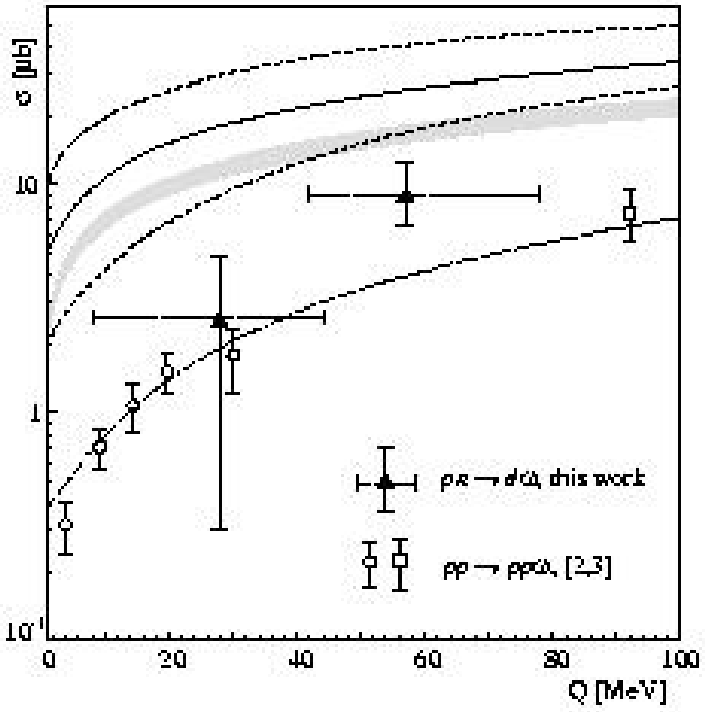


pp→ppω (DISTO)@83MeV



ϖ/ζ-ratio on pn→dV

pn→dζ



S. Barsovet al.,nucl-ex/0305031.

Accepted publication for EPJ A.

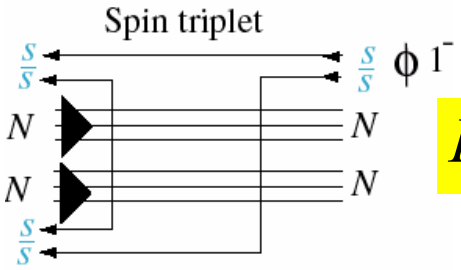
Isospin-spin Triplet

$$R_t(pp) = 1.6 \sim 7 R_{OZI}$$

Isospin-spin Singlet

$$R_s(d) = \frac{\sigma_s(\phi)}{\sigma_s(\omega)}$$?

J.Ellis et al Phys. Let. B353(1995)319-328

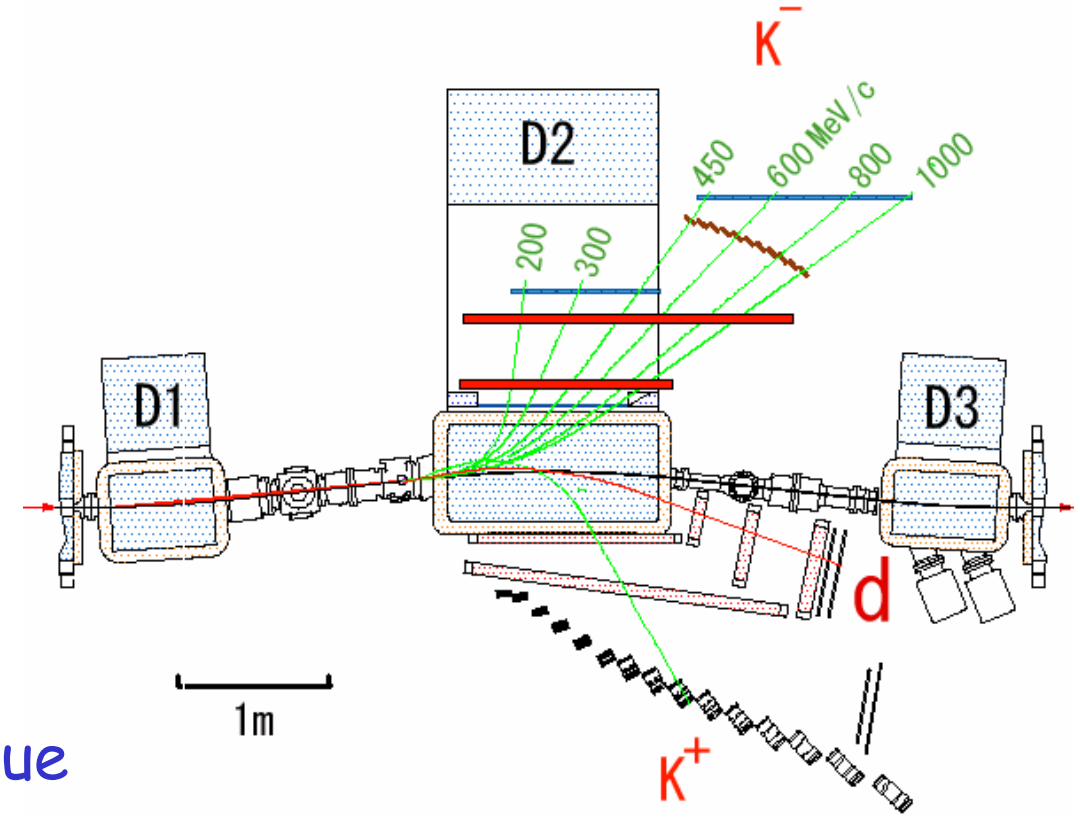


$$R_t(pp) >> R_s(d)$$

Experiment

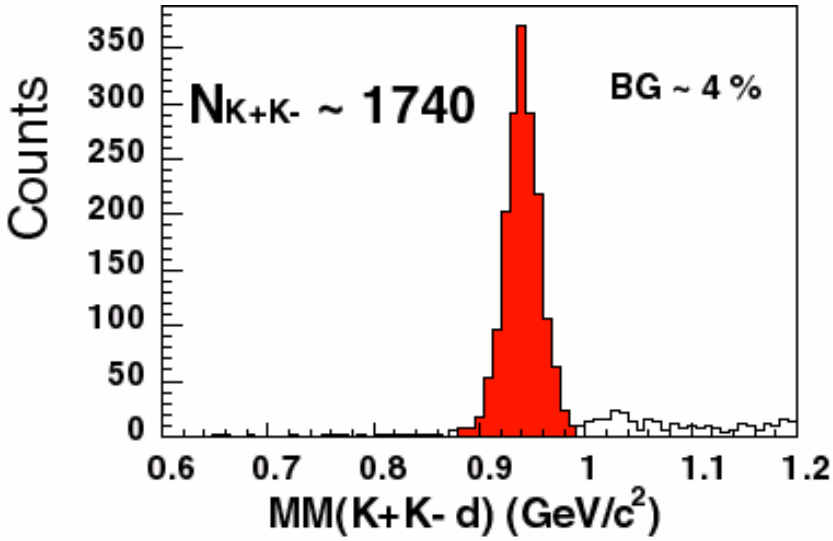
- Beam time
  - ✓ a_0/f_0 Ex (02/*/04)
- Ex condition
  - ✧ Proton Beam 2.65 GeV.
  - ✧ D_2 Target.
  - ✧ Pd&Nd(&Fd) Trig.
- Id condition
  - ✓TOF
  - ✓Missing mass technique

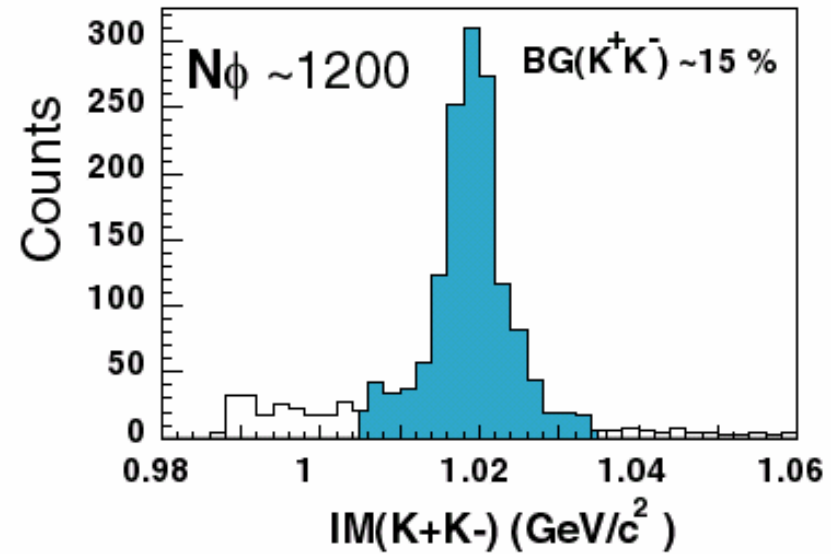
  p d ≙ d^{+}K K ps



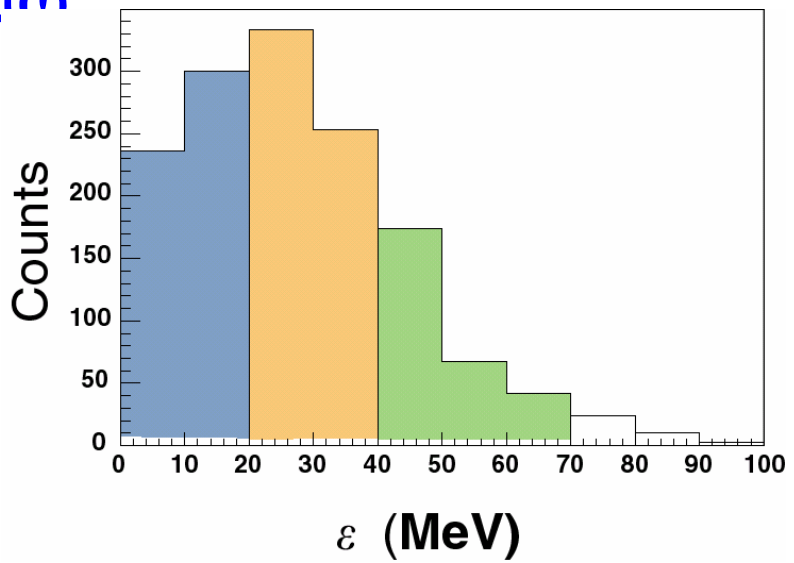
Identification of pd → dω ps

(60% of total data)



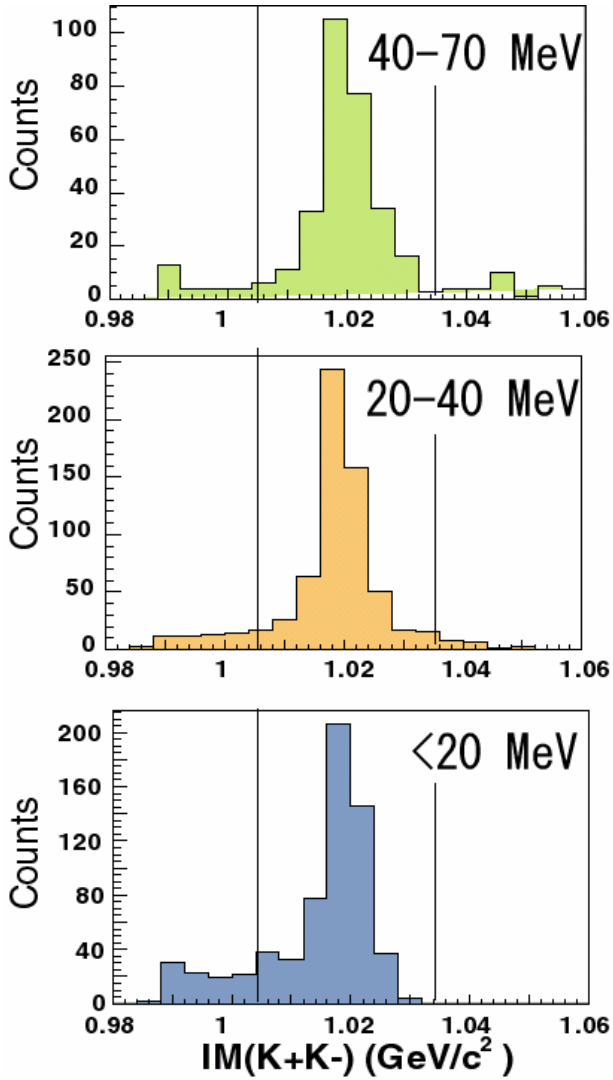


ε distribution of pn → dπ

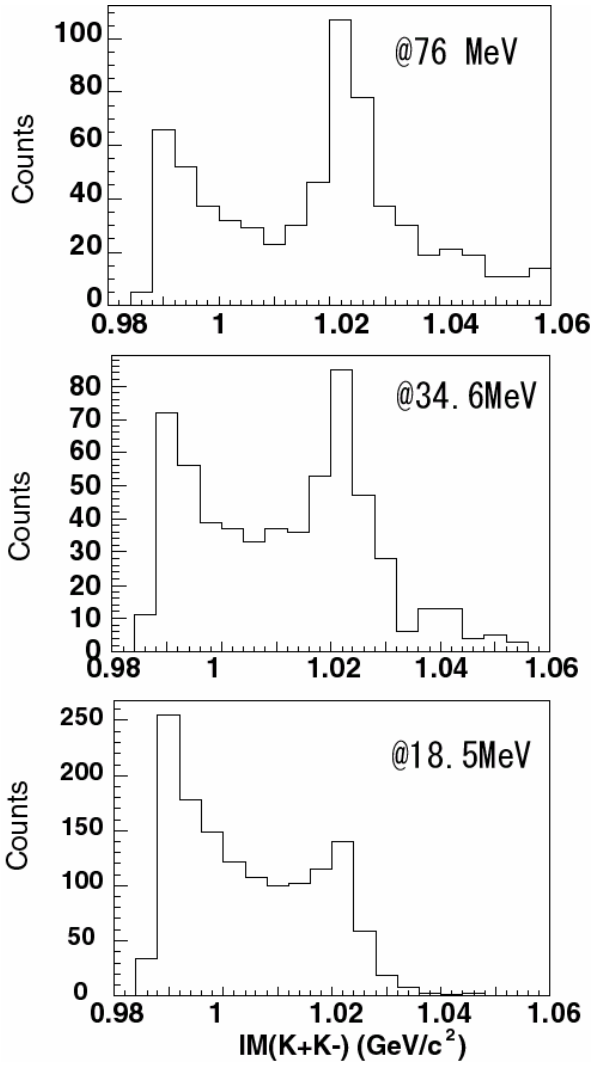


Energy dependence of IM

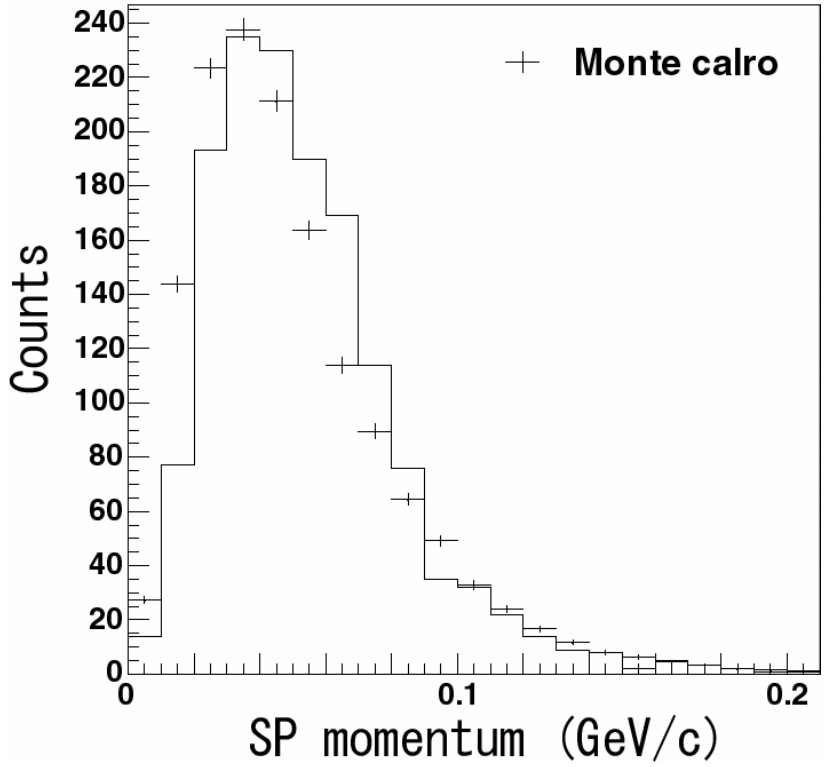
pn→dω

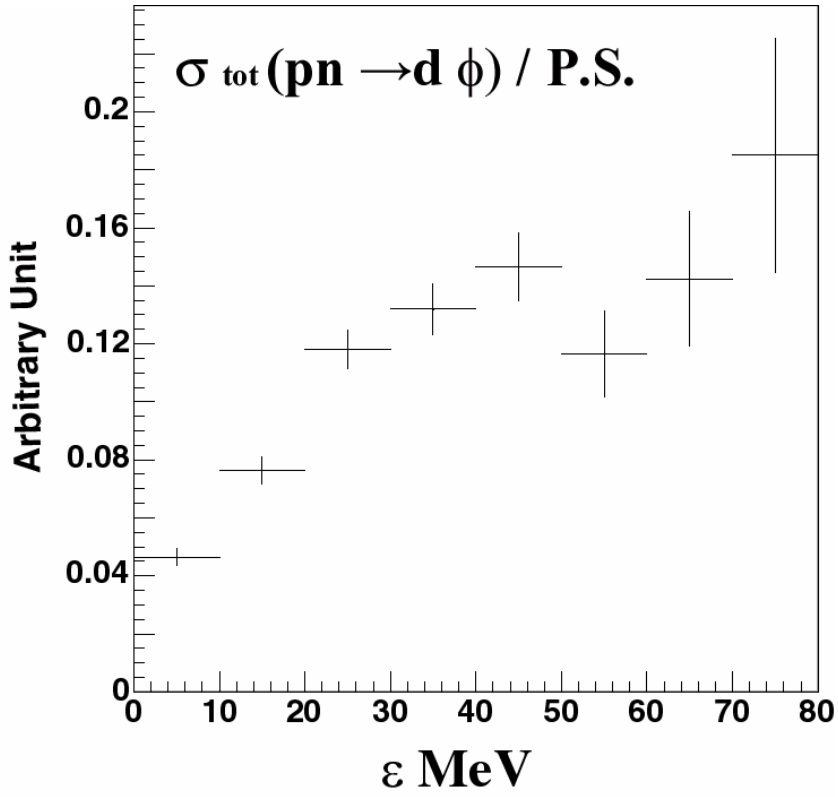


pp→ppω



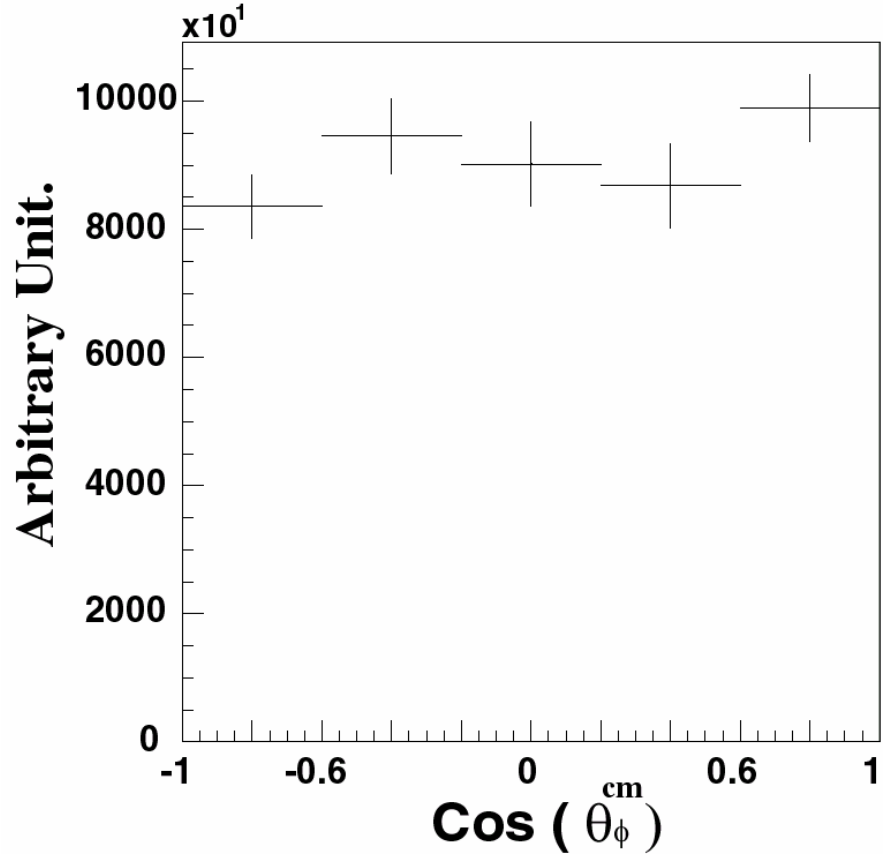
SP momentum and Energy dependence





Angular dependence

ε =10-70 MeV



Isotropy ?

- s-wave dominance

Summary

- ✧ Id of pd→d K^+ K^- p_s is OK (TOF,MM).
- ✧ Clear ϖ peak. BG(K^+ K^-) is small (~15 %).
- ✧ pn→dϖ at ε = 0 – 80 MeV.
- ✧ Energy dep. of ρ(pn→dϖ) > P.S.
- ✧ ◆ Momentum calibration
- ✧ Angular dep shows isotropic ◆ s-wave ϖ-pro.

To do,

Luminosity (Energy loss).

meson production

ρ(ppζ)ετ ρ(dζ) ?

- Since Vector meson?
- PS meson ρ(ppm) << ρ(dm)