



ACCELERATOR LABORATORY
ADVANCED RESEARCH CENTER FOR BEAM SCIENCE
INSTITUTE FOR CHEMICAL RESEARCH
KYOTO UNIVERSITY



Application of ILC

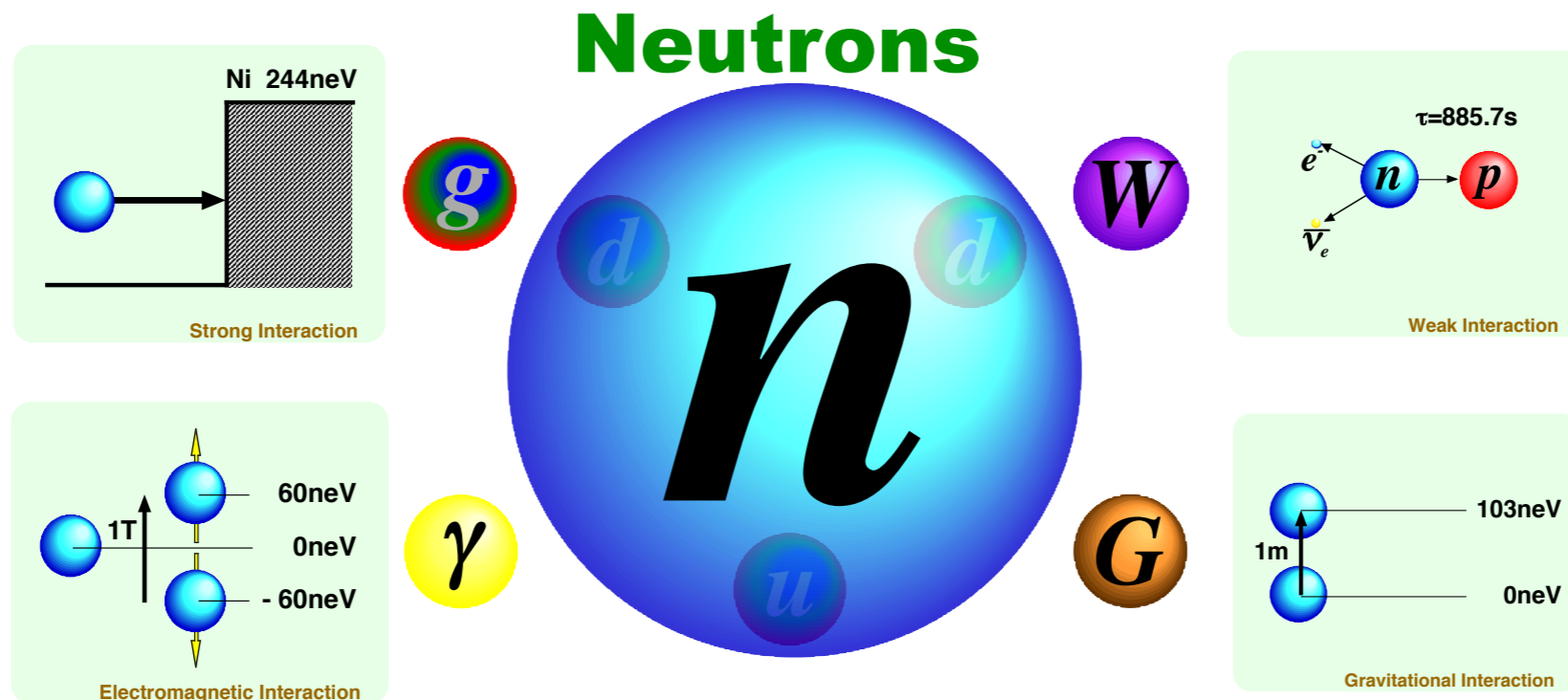
– Diversified Application of ILC –

Y. Iwashita, Kyoto University

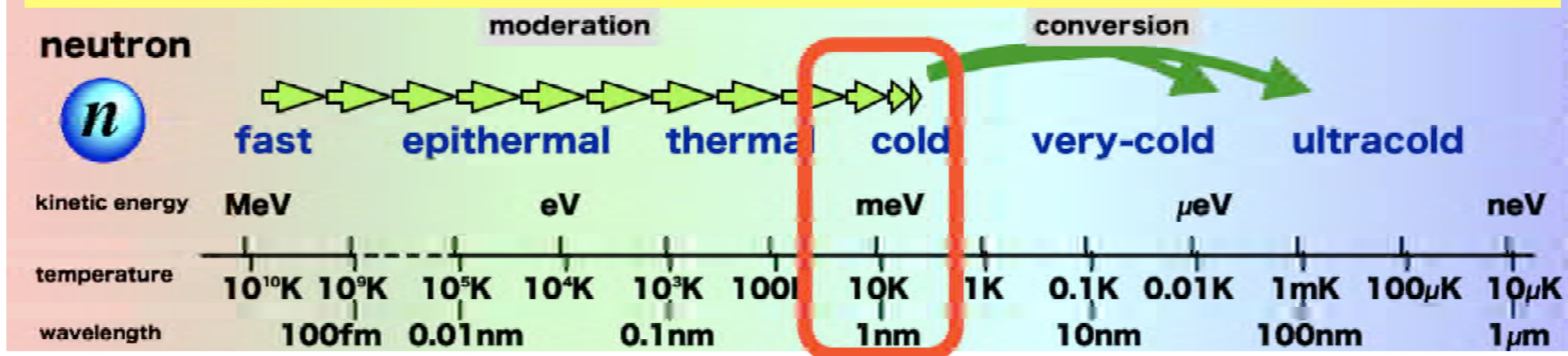


Diversified Application of ILC

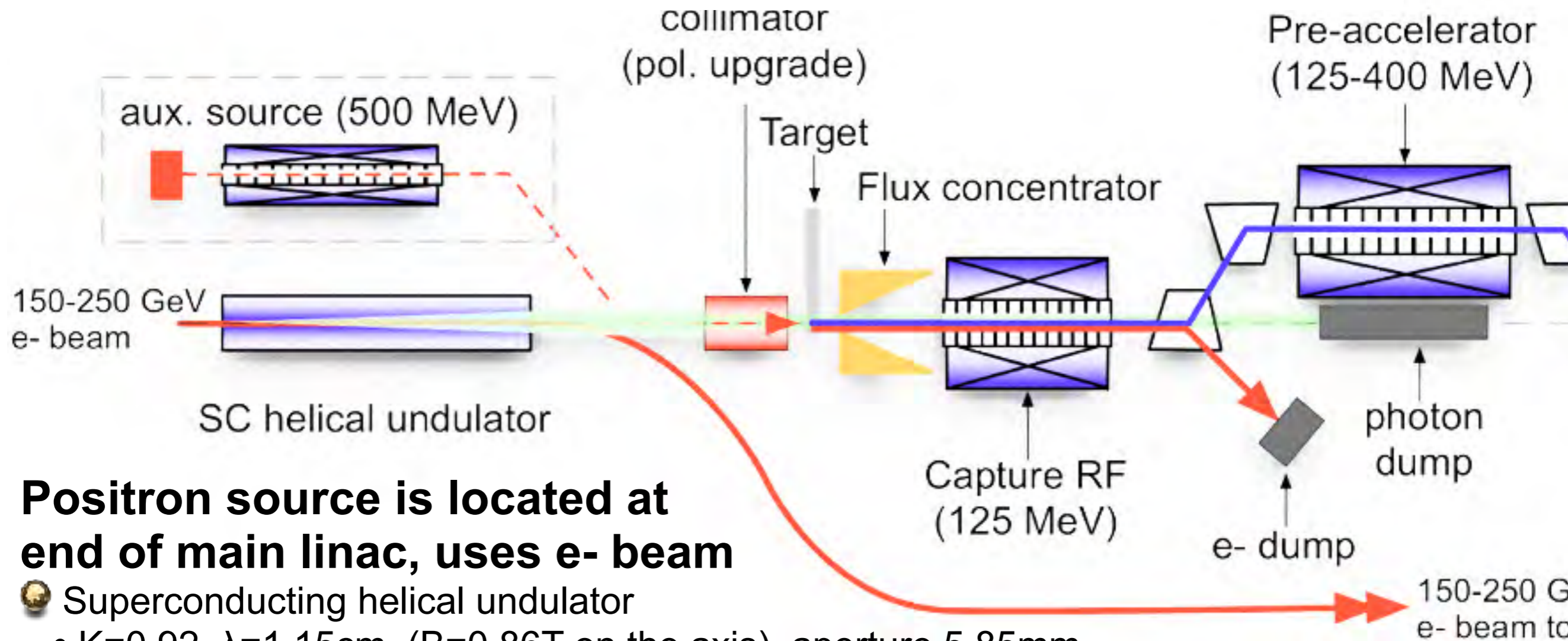
This action arose to generate better neutrons from enormous photons at the position source.



suitable for precision measurement



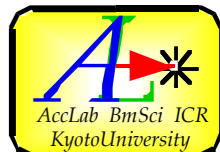
Positron Source



Positron source is located at end of main linac, uses e- beam

- Superconducting helical undulator
 - $K=0.92$, $\lambda=1.15\text{cm}$, ($B=0.86\text{T}$ on the axis), aperture 5.85mm
 - Max 231m active length
- e+ Production Target
 - 400m downstream the undulator
 - 0.4 X0 Ti alloy
- e+ polarization, Default: $\sim 30\%$, polarization upgrade up to 60%: photon collimator
 - Polarization sign is determined by undulator winding \Rightarrow Spin Flipper

150-250 GeV
e-beam to BDS

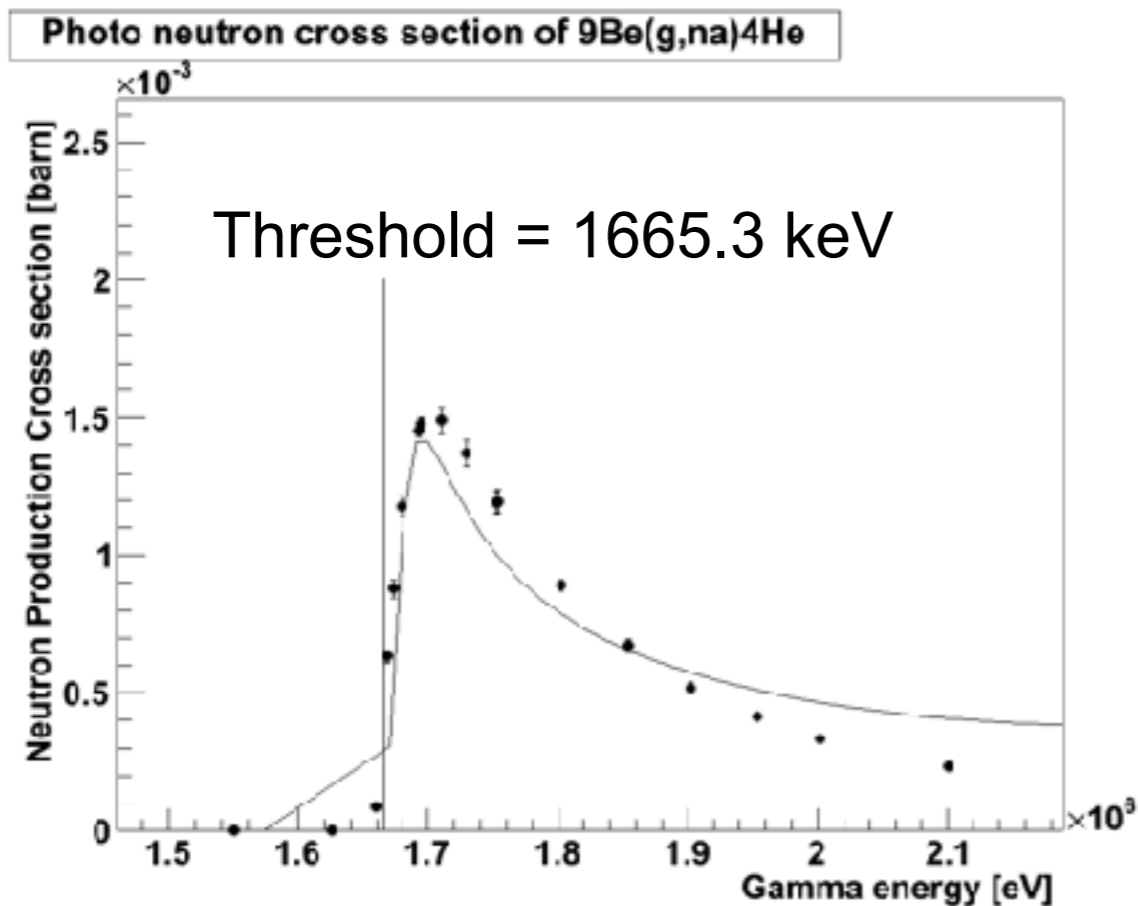


Candidates of photo-neutron targets

(γ, n) cross sections are not well studied, especially around threshold.

^9Be

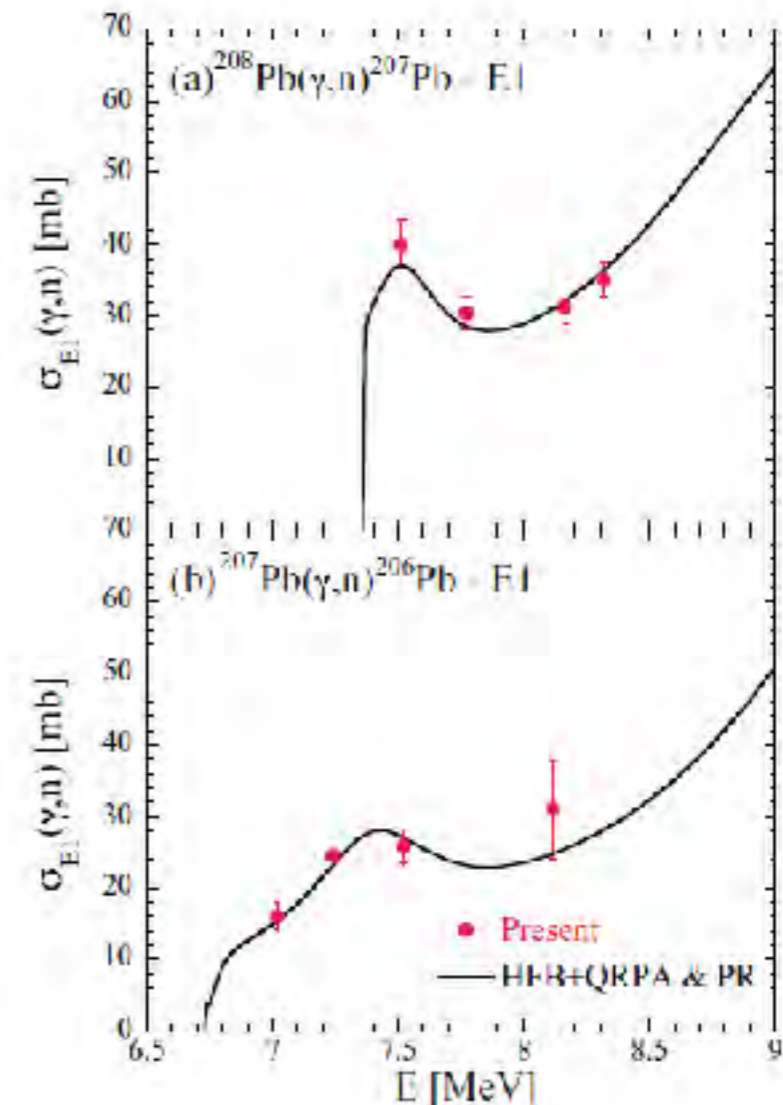
- Threshold = 1665.3 keV
- $\sigma^{^9\text{Be}(\gamma, n\alpha)^4\text{He}}$ at 1700 keV is 1.5 mbarn



C.W.Arnold et al., PhysRevC.85.044605
With ENDF data

$^{207-208}\text{Pb}$

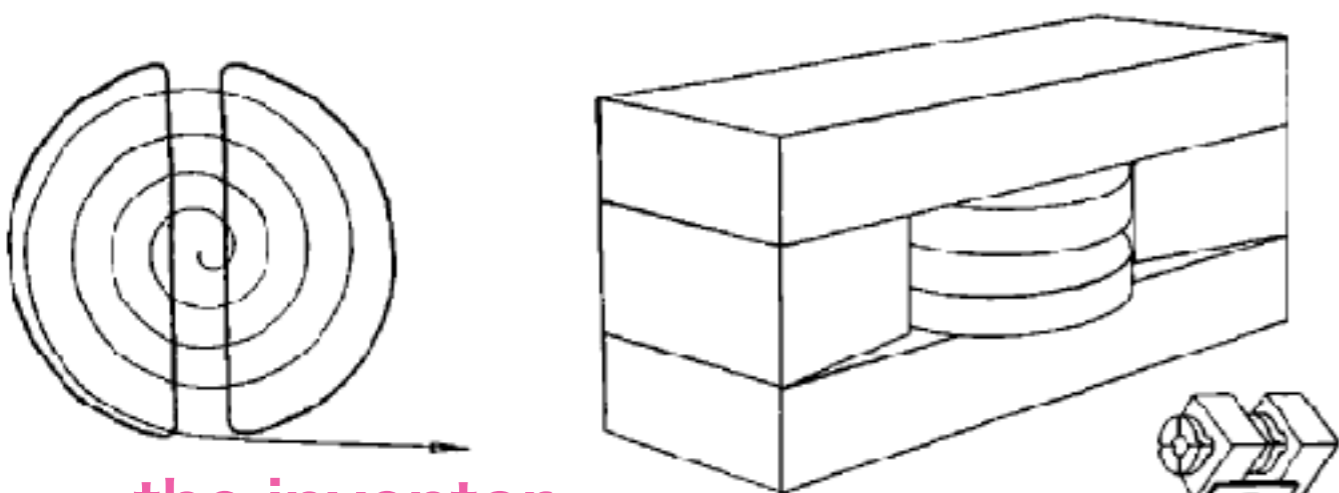
- Threshold (^{207}Pb) = 6738 keV
- Threshold (^{208}Pb) = 7368 keV
- $\sigma^{\text{Pb}(\gamma, n)}$ is 10~30 mbarn at 100 keV above the threshold



T. Kondo et al., PHYSICAL REVIEW C **86**, 014316 (2012)

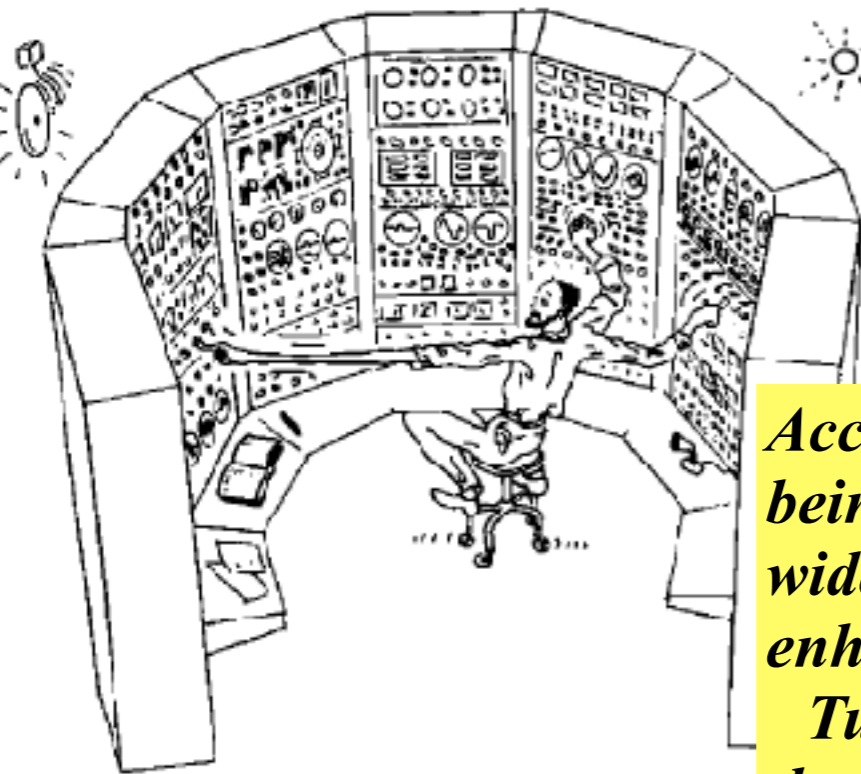
Cartoons by David L. Judd and Ronald MacKenzie

The Cyclotron as seen by . . .



... the inventor

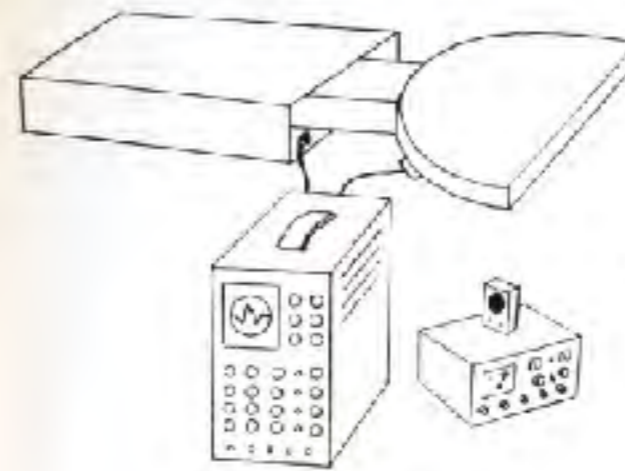
... the mechanical engineer



... the operator

Accelerators consist of many fields: fruits of human beings. The precious facility could Contribution to widely spread science fields. Diversity of the usage enhances efficiencies to share knowledge and merits.

Tunnels or extra spaces have to be incorporated from the beginning. Raise the attention of researchers who are not interested, and dig up discussions to sublimate attractively.

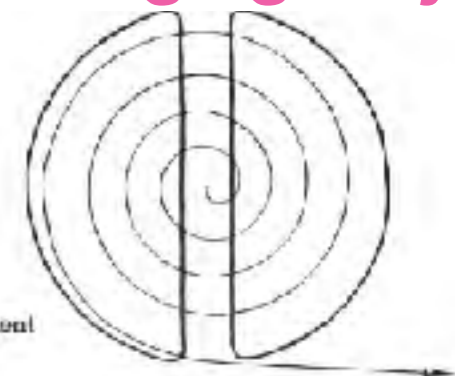


... the electrical engineer

... the experimental physicist



... the government funding agency



... the student

WG6: divILC activities so far

In order to explore possibilities of this unique facility, events were held to discuss diversified applications on ILC and/or its facilities and to gather as many personnel who have not been interested in ILC so far.

1) **First kick off meeting:** 2017/11/29-30
@ KEK 2Bldg.1F— Report in Japanese



2) IPAC'18 @Vancouver:
<http://accelconf.web.cern.ch/AccelConf/ipac2018/papers/mopml047.pdf>

3) **2nd meeting:** 2018/7/5-6
@ Uji Campus, Kyoto University
<https://conference-indico.kek.jp/indico/event/52>



4) 3rd workshop of Concepts of neutron sources (CoNS-III)
2018/8/21@KEK Tokai 1-gokan Rm324
<http://www2.kek.jp/imss/kens/topics/2018/07/191648.html>



5) **3rd meeting:** 2018/11/13-14
@ KEK 3Bldg.1F — Report in Japanese

6) JAPAN-SPAIN WORKSHOP ON OPPORTUNITIES ON ACCELERATORS: 2018/12/10 Madrid

7) **Symposium at JPS meeting:** 2019/3/15 15pF303

10/29(Tue)

PM1 14:15-16:00

- Introduction: Iwashita
- Possible beam conditions in ILC: Yokoya
- Muon pair production from ILC: Shimomura
- Production of a coherent bremsstrahlung photon beam with several tens of GeV at ILC: Muramatsu
- Ultrahigh Intensity Lasers at the ILC: Applications and Fundamental Physics: Koga
- Electron beam possibilities explored at CERN for Dark Sector Studies : S.Stapnes
- CLEAR, an electron beam facility at CERN, Roberto Corsini
- Discussion:

PM2 16:20-18:00

- Industrial application of "Compact ERL (cERL)": Sakai
- CompactLight, a X-band based FEL facility: Gerardo D'Auria
- Gamma-gamma collider on the energy $W < 12$ GeV based on European XFEL as a precursor of PLC at the ILC: Valery Telnov
- R&D of high-coherence superconducting quantum systems: Mattia Checchin
- Superconducting Accelerator based Compact Neutron Source: Y. Iwashita
- Discussion