Brief summary of DR/BDS/DUMP group meeting (11/24)

Attendees : Jenny List, Thomas Markiewicz, Shin Michizono, Toshiyuki Okugi, Maxim Perelstein,, Sabine Riemann, Robert Rimmer, Roger Ruber, Ben Shepherd, Nilolay Solyak, Nobuhiro Terunuma, Kaoru Yokoya

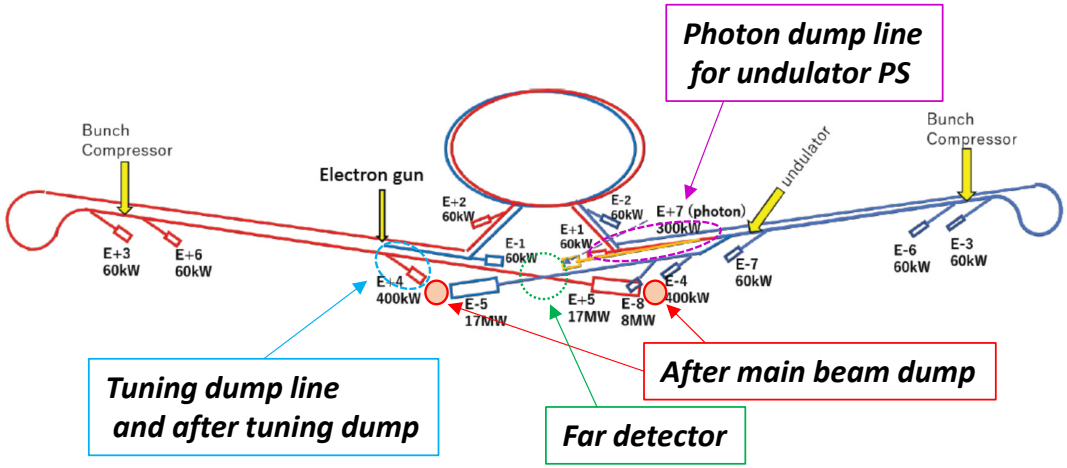
2021/11/30

Toshiyuki OKUGI, KEK

IDT WG2 meeting

Maxim Perelstein (WG3 fixed target group) was invited to exchange information on the ILC fixed target experiment.

Proposed location of ILC fixed target experiment



Fixed target experiment after main dump

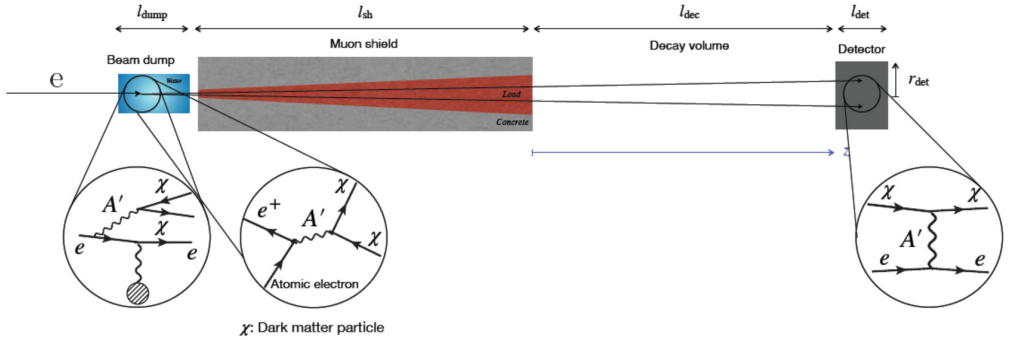
- *can be performed simultaneously with ILC main experiment*

Setup for invisible decay search

Sensitivity comparison of positron and electron beam dump experiment

[K. Asai, S. Iwamoto, M. Perelstein, Y. Sakaki, DU.]

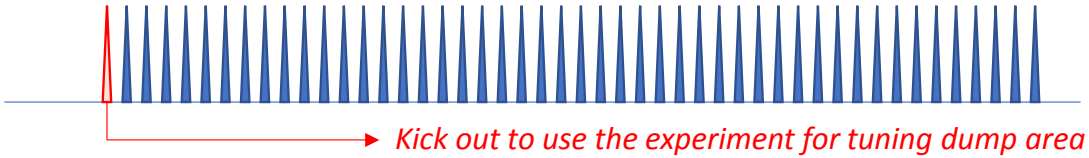
$l_{\rm dump} = 11{\rm m},\ l_{\rm sh} = 70{\rm m},\ l_{\rm dec} = 50{\rm m},\ r_{\rm det} = l_{\rm det} = 1{\rm m}$



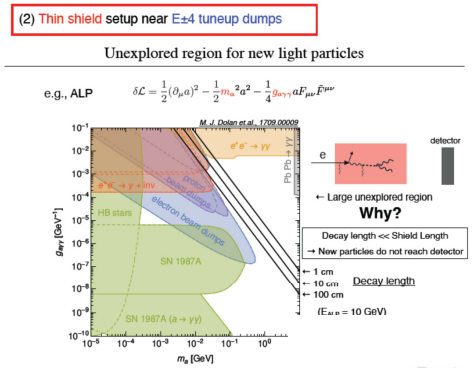
χ: Dark matter particle

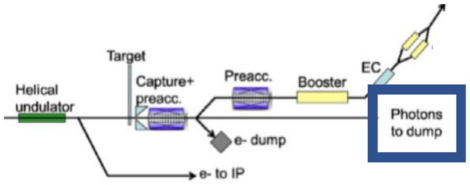
Tuning dump area

- *use only 1 bunch of the bunch train.*
- *0.1% of the luminosity loss for ILC main experiment*



Fixed target experiment after tuning dump



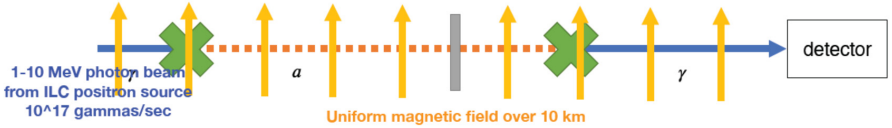


Photon beam line

- *after the target of undulator PS*
- *can be performed simultaneously with ILC main experiment*

Search for new light particles

- A new light particle x may mix with the photon
- Magnetic fields are imposed on the entire path



- We assume the path is of the similar length as the ILC itself

Strong QED experiment at tuning dump line

- Propose an experiment at E-4 beam at the ILC, with external laser (projecting $\sim 10^{24}$ W/cm^2 by the mid-2030's)
- Several experimental setups:
- Elementary e-gamma interactions $\chi \sim 200$
- Coherent e+e- plasma
- High-density (incoherent) e+e- plasma
- Applications: high-density plasma in astrophysics (magnetars, AGNs); gamma-gamma colliders; etc. Numerical codes can be validated/ improved by data

Far detector

- *only put the detector at far detector area*
- *can be performed simultaneously with ILC main experiment*