

Gamma-Gamma in Microwave Collider

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- ILC, CLIC, CEPC, FCC, ...
- Coming sooner (if any) than plasma colliders
- Need to prepare for gamma-gamma
- Chicken & eggs problem
 - Already 12 years since the start of ILC
 - $\gamma\gamma$ Technology is not ready
 - Main reason that Sugawara's proposal was rejected
 - \leftrightarrow No strong voice to $\gamma\gamma$
- Major obstacle is the laser technology
 - People would not move unless laser technology be confirmed (multi-billion dollar projects)
 - Laser physicists and accelerator physicists must collaborate
 - Lasers which fit to $\gamma\gamma$ will not be made just by waiting for laser physicists
 - Different bunch patterns for ILC, CLIC, CEPC,

- There are lots of other issues, if you really want to construct gamma-gamma
 - Interaction region design
 - Detector design
 - Photon dump
 - Beamline
- Present ILC human resources do not allow studies on these issues (note: engineering level design is needed for real construction.)
- These can start only when the laser is ready
- Some of them must be done now (later changes too much expensive)
 - Crossing angle for ILC
 - Choice of injector for CEPC
 - RF (incl. frequency), magnets (rapid cycle), vacuum system

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Conclusion

We need Lasers, Lasers, Nothing but Lasers