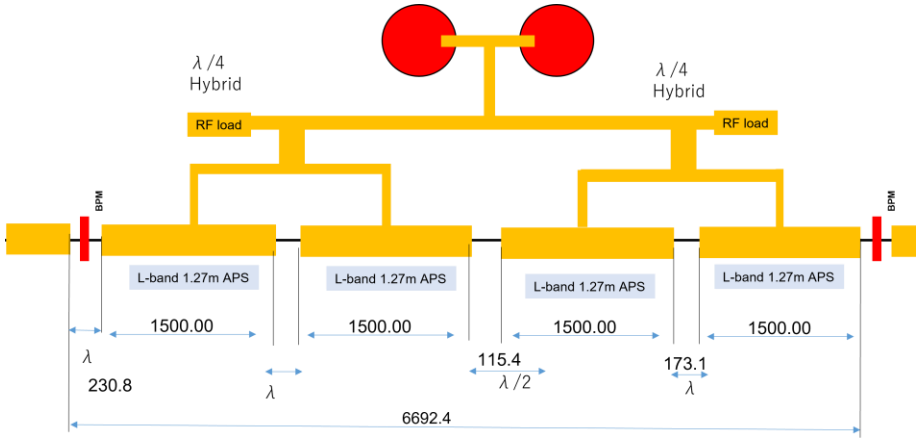
Sources Subgroup Summary

IDT-WG2, Sep.06. 2022, K. Yokoya

- Aug.29 30th Regular meeting
  - ✓Masao Kuriki, Kaoru Yokoya, Gudi Moortgat, Peter Sievers, Sabine Riemann, Joe Grames, Tsunehiko Omori, Hitoshi Hayano, Tohru Takahashi
  - ✓Indico https://agenda.linearcollider.org/event/9798/
- Talk by Masao Kuriki "Beam Loading Treatment in ILC E-Driven Positron Source"
  - ✓Uploaded in the above indico page
  - ✓Beam-loading issue of the e-driven positron source
  - ✓Capture cavity (L-band APS-type, SW) and cavities in the booster (L- and S-band, TW)
- Next meeting
  - ✓Presumably, Sep.12 (Mon)

Beam Loading Treatment in ILC E-Driven Positron Source (M.Kuriki)

- Beam-loading is one of the important issues for the e-driven linac because of the high instantaneous current and the special pulse structure
- APS SW cavity
  - ✓ Discussed using a single-cell model, including off-crest case.
  - ✓ Beam loading can be compensated by using PM (phase modulation) and AM (amplitude modulation)



In phase (PM)

$$V_{RF}e^{i\phi} + V_{RF}e^{i\phi} = 2V_{RF}e^{i\phi}$$

Anti-phase (AM)

$$V_{RF}e^{i\phi} + V_{RF}e^{-i\phi} = 2V_{RF}e^{i\phi}\cos\phi$$

Mixture PM+AM

$$V_{RF}e^{i(\phi_1+\phi_2)} + V_{RF}e^{i(\phi_1-\phi_2)} = 2V_{RF}e^{i\phi_1}\cos\phi_2$$

- TW cavity
  - ✓ Discussed using wave propagation equation of constant gradient type
  - ✓ only on-crest case
  - ✓ Beam loading can be compensated by using AM for loading compensation