

## Towards a full C-band multi-bunch/high rep. rate/high gradient injector linac

*Monday, 3 June 2013 16:30 (25 minutes)*

The use of RF C-Band accelerating structures for electron acceleration and production of high quality beams has been recently proposed and adopted in several linac project all over the world. The current projects foreseen the use of an S-band injector combined with a C-band linac booster. C-band accelerating cavities have been also proposed for the ELI-NP project and, because of the multi-bunch operation, the cavities integrate an HOM damping system. A full C-band injector that combines a C-band high rep. rate multi-bunch RF gun with C-band damped accelerating structures are the next and definitive step in the C-band systems. Beam dynamics simulations show excellent and feasible features. A complete design in term of single/multi bunch beam dynamics and RF system is presented.

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**Session Classification:** WG3 - Electron beams from electromagnetic structures, including dielectric and laser-driven

**Track Classification:** WG3 RF - Electron beams from electromagnetic structures, including dielectric and laser-driven