SLAC COLLOQUIUM SERIES

C^3 – Cool Copper Collider:
An Advanced NCRF Linac Concept for a High Energy e^+e^- Linear Collider

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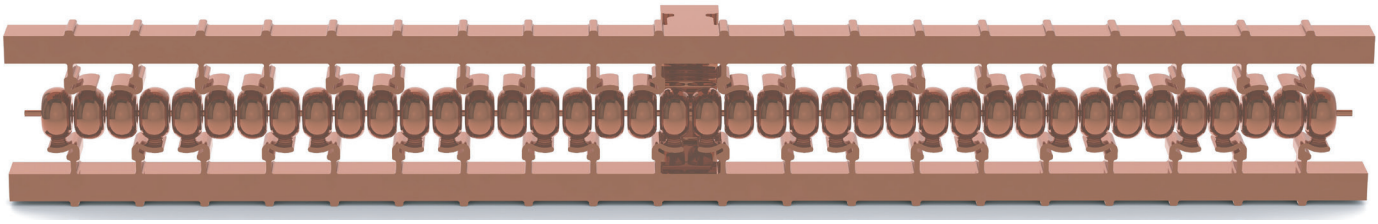
Abstract:
We have explored a concept for an advanced Normal-Conducting Radio-Frequency (NCRF) C-band linear accelerator (linac) structure to achieve an economic high gradient, high power e+e− linear collider in the TeV class. This design study represents the first comprehensive investigation for an emerging class of distributed coupling accelerator topologies developed at SLAC[1] exploring cavity geometries, frequency and temperature of operation. The structure features internal manifolds for distributing RF power separately to each cell, removing the requirement for RF power to propagate through the irises, and permitting the full structure geometry to be designed for high efficiency and high accelerating gradients. We find that it is advantageous for the structure to be cooled directly by liquid nitrogen (LN), further increasing the RF to beam efficiency. The first operation of a distributed coupling structure at cryogenic temperatures and an operating gradient of 150 MeV/m will be described, which has demonstrated the feasibility of achieving high-gradient performance with a cryogenically-cooled normal-conducting accelerating structure. A key element for developing this technology are the many related applications in medicine and security, and these will also be discussed as a platform for advancing this technology.



[1] *Tantawi, et al., U.S. Patent No. 9,386,682. 5 Jul. 2016.*

November 18, 2019, Kavli Auditorium, refreshments start at 3:15 and colloquium at 3:30 pm