

# Particle Physics Seminar

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## **Advance EM concepts for particle accelerators and compact sources of coherent radiation**

One of the challenges in modern physics is fine control of electromagnetic (EM) radiation and its interaction with matter. Applications which require such control include the life sciences and security, physics of plasmas and accelerators, pharmaceutical industry and mining industry, astrophysics and etc. In this talk I will discuss the applications of advance EM concepts for particle accelerators (including diagnostics and compact energy recovery LINACs) and compact sources of coherent radiation. The application of surface periodic structures (one and two dimensional) with tailored dispersive properties for longitudinal beam diagnostics and generation of coherent high-power (up to kW level) terahertz radiation will be presented. While the use of the conventional metamaterials in such applications meets a number of problems (coherence of the scattered radiation and mode control; induced surface charge dissipation (self-charging); overheating and field break-down) the use of periodic surface structures should help to overcome some of the above challenges. I will also discuss a new concept of asymmetric energy recovery LINACs which will be capable of generating and utilising electron beams of the average current above 1A as well as progress in development of the single shot electron bunch diagnostics based on spectral analysis of coherent Smith Purcell radiation.

**Wednesday  
17th February  
4pm in T125**



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