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# The STAR Project

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The Southern European Thomson source for Applied Research (STAR) project ultimate goal is to install, commission and operate a dedicated user facility that produces monochromatic tunable, ps-long, polarized X-ray beams, ranging from 20 to 140 keV. These X-rays will be devoted to peer reviewed experiments dealing with material science, artifacts of archeological significance and advanced radiological imaging. STAR Phase I uses an emittance compensated 1.6 cell S-Band RF Photoinjector operating at a 100 Hz to produce a single electron bunch which is then boosted up to 60 MeV by a single SLAC Type 3 meter Travelling Wave Constant Gradient accelerating structure. For STAR Phase II, a second SLAC 3 meter section can be added to the machine without any significant impact on the user program. A dogleg will bring the beam on a parallel line, shielding the X-ray line from the background radiation due to LINAC dark current. In this talk, we shall present the overall design of the STAR Machine. In particular, we will discuss in detail the Beam Dynamics, RF System, Laser System: (Photocathode and Interaction Laser), and the electron beam diagnostics necessary to operate STAR as a dedicated user facility.

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