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Design of the FCC-ee positron source target: current status & challenges

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The FCC-ee positron source target is the device in charge of generating particles (i.e. positrons) by colliding a high intensity primary electron beam on it, which produces gamma rays and triggers the pair production mechanism.

At a design level, the positron target presents two main challenges: i) a high-energy deposition density due partly to a small incident beam size and ii) the integration of equipment to accelerate and capture the produced positrons in a limited space. The following talk will focus on the first challenge. To this end, the selected material for the target is tungsten, due to its high Z number and its remarkable thermomechanical properties at high temperatures. However, a specific cooling circuit must be included in the design to properly dissipate the thermal power produced by the beam impact. Once the resulting thermal field is calculated, the associated thermo-mechanical stresses are obtained, which must be within the safety limits of the material.

To sum up, an overview of the positron source target's status will be provided together with the following R&D steps to continue the project.

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