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First design studies on a NC CW RF gun for European XFEL

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High brightness high-repetition rate (MHz-class) electron source for European free-electron lasers (FELs) upgrade program is under design at the Photo Injector Test facility at DESY, Zeuthen site (PITZ). A normal-conducting (NC) cavity resonating in the VHF band at 216.7 MHz operating in continuous wave (cw) mode is chosen as the backup candidate. The preliminary design studies of the NC cw RF gun was carried out. The cathode gradient and voltage were pushed to 30 MV/m and 860 kV to improve the beam brightness. This poster presents the RF design and optimization of the copper cavity, multipacting simulation, beam dynamics study as well as the mechanical thermal and stress analysis.

Primary author: Dr SHU, Guan (DESY)

Co-authors: STEPHAN, Frank (DESY); Dr QIAN, Houjun (DESY); Dr LAL, Shankar (DESY); CHEN, Ye (DESY)

Presenter: Dr SHU, Guan (DESY)

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