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Design of a single mode 3rd harmonic cavity for PETRA IV

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The upgrade of PETRA III to PETRA IV at DESY is currently in its design phase. To achieve the desired beam parameters a 3rd harmonic cavity is necessary for the accelerating system. An investigation of three types of cavity structures thus is conducted to find the most cost effective and environmentally sustainable option. A high focus in this investigation is placed on the damping of higher order modes. Therefore, two of the investigated structures are so called single mode structures. Such structures have its cavity directly coupled to an RF-absorber, allowing for damping of all resonant modes but the desired ground mode. The design considered in this paper is from a conceptual test of Helmut Herminghaus (MAMI, Mainz, DE). Taking the requirements of PETRA IV into account, the design is adapted, numerically simulated and optimized.

Footnotes

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