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Capture Cavities for the CW Polarized Positron Source Ce+BAF

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The initial design of the capture cavities for the continuous wave (CW) polarized positron beams at Jefferson Lab (Ce+BAF) is presented. A chain of standing wave multi-cell copper cavities inside a solenoid tunnel are selected to bunch/capture positrons. The cavity design strategy is presented to accommodate constraints from the large phase distribution of the incident beams, RF power, radiation and RF heating, beam loading, etc. to improve the capture efficiency. A matrix of design parameters' range are given for future system optimization when the capture cavities are considered together with other sub-systems and beam dynamics. The contents will also be useful for other CW cavity design for beams with large phase space distribution.

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Primary author: WANG, Shaoheng (Jefferson Lab)

Co-authors: USHAKOV, Andriy (Jefferson Lab); WANG, Haipeng; GRAMES, Joseph (JLab); Dr RAUT, Nabin (Jefferson Lab); RIMMER, Robert (JLab); ROBLIN, Yves

Presenter: WANG, Shaoheng (Jefferson Lab)

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