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CEPC partial double ring scheme and crab-waist parameters

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In order to avoid the pretzel orbit, CEPC is proposed to use partial double ring scheme in CDR. In this paper, a general method of how to make a consistent machine parameter design of CEPC with crab waist by using analytical expression of maximum beam-beam tune shift and beamstrahlung beam lifetime started from given IP vertical beta, beam power and other technical limitations was developed. Based on crab waist scheme, we hope to either increase the luminosity with same beam power as Pre-CDR, or reduce the beam power while keeping the same luminosity in Pre-CDR. FFS with crab sextupoles will be developed and the arc lattice will be redesigned to achieve the lower emittance for crab waist scheme.

Author: Dr WANG, DOU (IHEP)

Co-authors: Prof. ZHANG, Chuang (IHEP); Dr SU, Feng (IHEP); Prof. XU, Gang (IHEP); Dr GENG, Huiping (IHEP); GAO, Jie (IHEP); Mr ZHAI, Jiyuan (IHEP); Mr XIAO, Ming (IHEP); QIN, Qing (Institute of High Energy Physics, Chinese Academy of Sciences); Dr BAI, Sha (IHEP); Mr BIAN, Tianjian (IHEP); CHOU, Weiren (Fermilab); Dr CUI, Xiaohao (IHEP); Dr WANG, Yiwei (IHEP); Dr ZHANG, Yuan (IHEP); Dr GUO, Yuanyuan (IHEP)

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