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X-band Pulse Compressor schemes for TDS systems of S3FEL

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Recently, a soft X-ray FEL facility, Shenzhen Superconducting Soft-X-ray Free Electron Laser(S3FEL), has been approved by the national government of China. S^{3}FEL is a high repetition rate soft-X-ray super-conducting free-electron laser facility that consists of a 2.5 GeV CW superconducting linear accelerator and four initial undulator lines, which aims at generating X-Rays between 40 eV and 1 keV at repetition rates up to 1 MHz. In S3FEL, Transverse Deflecting Structures (TDS) that work at S-band (2997.222 MHz) and X-band (11988.889 MHz) will be utilized for the diagnosis and analysis of longitudinal phase-space of electron bunches. According to the preliminary design, about 60~80 MW RF power is needed for 1 X-band TDS system. Meanwhile, the output power of X-band klystron is 20 MW, which means pulse compressors are necessary. Three pulse compressor schemes are under considering: SLED, spherical cavity and bowl-shaped cavity. The comparison between these three schemes will be carried out later and one of them will be chosen for S3FEL.

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