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Study on a self-resonating optical cavity for high-brightness Laser-Compton Scattering X-ray sources

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Laser Compton Scattering (LCS) is a technique to produce quasi-monochromatic X-rays and gamma rays by colliding a laser with a high-energy electron beam produced by an accelerator. Although LCS light sources are expected to produce photons of the same quality in a small (6m x 8m) device as those from large synchrotron radiation facilities, the low number of scattered photons is an issue for practical use. To solve this problem, we have developed an optical cavity to generate colliding lasers with high repetition rate and high peak power. However, the operation of an optical cavity in an accelerator environment with high noise limits the stored optical power by maintaining resonance through resonator length control. Therefore, we have devised and are developing a self-resonating optical cavity in which the resonance is maintained spontaneously by connecting the optical storage resonator and the laser oscillator in a closed loop. In this talk, I will report on the current status of self-resonating optical cavity and its temperature dependence.

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Footnotes

I have read and accept the Privacy Policy Statement

Yes

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