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Free Electron Laser Seeded by Betatron Radiation

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The possibility of using a plasma accelerated electron beam to generate Free Electron Laser (FEL) radiation has recently been proven. In the plasma acceleration process an intense broadband spectrum radiation in the X ray region, the betatron radiation, is produced by the electron beam passing through the ionized gas.

In this paper it is proposed to use this radiation, suitably monochromatised, as a seed to stimulate the emission in the Free Electron Laser on the fundamental frequency and on the higher harmonics. This scheme could be adopted from all FEL injected by plasma accelerated electron beams via particle or laser wakefield acceleration.

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