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Two-stream instability at soft X-ray wavelengths for increasing brightness of Compton sources NIKOLAI YAMPOLSKY, CHENGKUN HUANG, GIAN LUCA DELZANNO, DMITRY SHCHEGOLKOV, Los Alamos National Laboratory — We propose a novel scheme which may result in the next generation Compton source for soft X-rays. The scheme is based on creating the distribution of relativistic electron beam which consisting of several energy bands and allowing for the two-stream instability to develop resulting in a short scale density modulation. The multi-stream beam distribution is created within a single bunch through a series of manipulations with the electron beam phase space. As a result, several well separated energy bands with close energies can be formed. The wavelength of the microbunching caused by the two-stream instability strongly depends on the beam parameters and can be reduced down to soft X-ray wavelengths that are not achievable with other mechanisms. The microbunching can be used for significant improvement of Compton sources brightness which is estimated to be 5-6 orders of magnitude.

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