

# Physics and Applications of High Brightness Beams



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## Ponderomotive Microbunching for a Superradiant Thomson Source

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Compact sources offering high-brightness radiation in the extreme ultraviolet to X-ray regime are highly desired. Thomson scattering, in which an electron beam colliding with a laser pulse produces radiation, is a source of X-rays of increasing prevalence in modern labs, complementing large scale facilities like synchrotrons and X-ray free electron lasers. By imposing a density modulation on the electron beam the brilliance of a Thomson source can be enhanced by orders of magnitude via superradiant emission. However, microbunching at the electron beam energy relevant to Thomson sources is a challenge that has yet to be met. Here, we show under which conditions sufficient density modulation is attained by the ponderomotive force from the copropagating beat wave formed by two laser pulses at different frequencies. In addition, we propose a coherent soft X-ray Thomson source based on ponderomotive bunching.

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