Abstract Submitted
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Coherent and incoherent radiation from ultra-intense laser interaction with nanostructured nickel nanowire ('velvet') targets[1] ROBIN MARJORIBANKS, MARINA SERVOL[2], PAUL FORRESTER, HART LEVY, LUKE MCKINNEY, BRETT TEEPLE, YVES CANDELA[3], University of Toronto, JEAN-CLAUDE KIEFFER, INRS-EMT, SIMON LE MOAL[4], GABOR KULCSAR, JOHN SIPE, University of Toronto, PATRICK AUDEBERT, JEAN-PAUL GEINDRE, LULI, CEA/CNRS/Ecole Polytechnique, ANNE HERON, JEAN-CLAUDE ADAM, CPhT, CEA/CNRS/Ecole Polytechnique — Nickel nanowires ('velvet') are a pure metallic anisotropic nanostructured material, averaging as much as one-quarter of solid density, that does not support material polarization- or current-densities required for Fresnel reflection. Since they present $> 90\%$ absorption and an effective skin-depth on the order of 1μm for intense laser light, they have been shown to be efficient x-ray converters. We show theoretical and experimental results of their behaviour under a range of irradiation conditions, from small-signal up to very clean pulses of relativistic-intensity laser light, including their transition from an effective dielectric to an effective metal, as the result of the generation of relativistic Brunel electrons.

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