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Characterization of betatron x-ray emission from wakefield accelerators KARL KRUSHELNICK, University of Michigan, CHRIS MCGUFFEY, UCSD, PAUL CUMMINGS, University of Michigan, WILL SCHUMAKER, SLAC, VLADIMIR CHVYKOV, University of Michigan, FRANKLIN DOLLAR, University of Colorado, Boulder, GALINA KALINTCHENKO, University of Michigan, TAKESHI MATSUOKA, Osaka University, MICHAEL VARGAS, VICTOR YANOVSKY, ALEC THOMAS, University of Michigan — We investigate betatron x-ray emission from laser wakefield accelerated electron beams using the HERCULES laser facility at the University of Michigan. The x-ray emission was observed to increase substantially after propagation of the generated electron beam beyond the plasma dephasing length. This was likely due to electron beam hosing instabilities seeded by interaction of the electron beam with the co-propagating laser pulse. The development of the hosing instability is confirmed by numerical modeling. We also investigate phase contrast imaging with this source at high x-ray energies and have compared the betatron emission with K-alpha emission from laser solid interaction in a similar experimental geometry.

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