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Dynamics of Non-linear Soft X-Ray Emission from a Plasma Discharge-Driven Hydride Target GEORGE H. MILEY, YANG YANG, MICHAEL ROMER, MUNIMA HAQUE, IAN PERCEL, ANDREI LIPSON, University of Illinois at Urbana-Champaign, Urbana, IL, 61801, USA, HEINZ HORA, University of New S. Wales, Sydney, Australia — A high current discharge apparatus with a pulsed power supply has been constructed and successfully demonstrated an intense soft x-ray (> 600 eV) emission during bombardment by a 300 V deuterium plasma discharge. Emission is delayed until $\sim 1/2$ ms into the msec voltage pulse¹. Both electron and ion Bremsstrahlung have been ruled out as significant contributions to the emission. A possible mechanism to explain this highly nonlinear x-ray emission is collective generation of soft x-ray quanta induced by a coherent D-diffusion process near the cathode's surface. This combined with continuous high current deuteron bombardment results in the penetration of recoil deuterons into the inner electron shell of the cathode material, generating x-ray emission.

¹G, Miley, et al., Trans. ANS, Washington, DC (Nov. 2005)

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