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Design and construction of a population inversion x-ray laser at LCLS

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We report our recent results on the project (XLO) to build, characterize and operate a population inversion xray laser at the copper $K\alpha_1$ line, using LCLS x-ray pulses as a pump. The results include: gain measurement; design, alignment and focusing elements for the optical bow-tie cavity; copper target measurement of damage caused by the pump pulses; development of a fast system to provide a fresh solid copper target for pump pulses separated in time by 35 ns; development of the generation and control of two electron bunches in LCLS to generate two X-ray pump pulses.

All the results obtained and discussed in this paper support the feasibility of XLO and the unique role it would have for scientific research in atomic and molecular science.

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Footnotes

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Primary author: Dr HALAVANAU, Aliaksei (SLAC National Accelerator Laboratory)

Co-authors: LUTMAN, Alberto (SLAC National Accelerator Laboratory); BENEDIKTOVITCH, Andrei (Deutsches Elektronen-Synchrotron); AQUILA, Andy (SLAC National Accelerator Laboratory); SAKDINAWAT, Anne (SLAC National Accelerator Laboratory); NARANJO, Brian (University of California, Los Angeles); TAKACS, Christopher (SLAC National Accelerator Laboratory); PELLEGRINI, Claudio (University of California, Los Angeles); DECKER, Franz-Josef (SLAC National Accelerator Laboratory); ROSENZWEIG, James (University of California, Los Angeles); LI, Kenan (SLAC National Accelerator Laboratory); DOYLE, Margaret (Lawrence Berkeley National Laboratory); LIANG, Mengning (SLAC National Accelerator Laboratory); YADAV, Monika (The University of Liverpool); MAJERNIK, Nathan (University of California, Los Angeles); ROHRINGER, Nina (Max Planck Institute for the Physics of Complex Systems); WELKE, Noah (University of Wisconsin-Madison); MANWANI, Pratik (University of California, Los Angeles); ROBLES, River (Stanford University); BOUTET, Sebastien (SLAC National Accelerator Laboratory); BERGMANN, Uwe (SLAC National Accelerator Laboratory); MAJERNIK, National Accelerator Stefan Institute); BERGMANN, Uwe (SLAC National Accelerator Laboratory); MANWANI, Pratik (University of California, Los Angeles); ROBLES, River (Stanford University); BOUTET, Sebastien (SLAC National Accelerator Laboratory); MATORY (SLAC National Accelerator Laboratory); MATORY (SLAC National Accelerator Laboratory); KRUSIC, Spela (Jozef Stefan Institute); BERGMANN, Uwe (SLAC National Accelerator Laboratory)

Presenter: Dr HALAVANAU, Aliaksei (SLAC National Accelerator Laboratory)

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