



Contribution ID: 2308 Contribution code: TUPL068

Type: **Poster Presentation**

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

Tuesday, 9 May 2023 16:30 (2 hours)

We report our recent results on the project (XLO) to build, characterize and operate a population inversion x-ray 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.

Funding Agency

Footnotes

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Yes

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Session Classification: Tuesday Poster Session

Track Classification: MC2: Photon Sources and Electron Accelerators: MC2.A06: Free Electron Lasers