Contribution ID: **524** Contribution code: **SUP029** Type: **Poster Presentation**

Picometer-scale emittance and space charge effects in nanostructured photocathodes.

Sunday 10 August 2025 15:00 (3 hours)

Generation of ultralow-emittance electron beams with high brightness is critical for several applications such as ultrafast electron diffraction, microscopy, and advanced accelerator techniques. By leveraging the differences in work function and electronic structure between different materials, we enabled spatially localized photoemission, resulting in picometer-scale emittance from a flat photocathode. We also investigated space charge effects by measuring how the emission spot size, as measured in a photoemission electron microscope, changes with the number of electrons emitted per laser pulse. When more than one electron is emitted simultaneously, Coulomb repulsion causes a substantial broadening of the observed source size, enabling us to investigate the limitations imposed by vacuum space charge forces during pulsed photoemission. Our results highlight the potential of nanoscale photoemitters as high-brightness electron sources and offer new insights into electron correlations that emerge after ultrafast photoemission.

Please consider my poster for contributed oral presentation

Yes

Would you like to submit this poster in student poster session on Sunday (August 10th)

Yes

Footnotes

Funding Agency

US National Science Foundation
US Department of Energy

I have read and accept the Privacy Policy Statement

Yes

Author: ULLATTUPARAMBIL, Anagha (Arizona State University)

Co-authors: MOEINI RIZI, Mansoure (Arizona State University); KAEMINGK, Michael (Los Alamos National Laboratory); BARTNIK, Adam (Cornell University); GORDON, Matthew (Cornell University (CLASSE)); ABBAMONTE, Cecilia (Cornell University (CLASSE)); LEVENSON, Samuel (Cornell University (CLASSE)); MAXSON, Jared (Cornell University); KARKARE, Siddharth (Arizona State University)

Presenter: ULLATTUPARAMBIL, Anagha (Arizona State University)

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