

This project would be a computational exploration, using the code ASTRA, of a broad parameter space associated with obtaining a minimum emittance (in phase space) beam from a DC photo-emission gun. Some knowledge of electrodynamics, classical mechanics, and relativity would enable the student to fully appreciate the results.

Time permitting, one could add the task of duplicating, through simulation, some carefully measured emittance results. These results show very interesting phenomena, and so far, we have not managed to get a simulation to agree with the measurements, of which we are quite confident.

Finally, for a well-prepared student, one could add some reading material about electron optics to help gain an even better understanding of the results of the simulations.

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