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Plasmonic Hot Carrier Transport and Collection in Nanostructures ADAM JERMYN, RAVISHANKAR SUNDARARAMAN, PRINEHA NARANG, WILLIAM GODDARD, HARRY ATWATER, California Institute of Technology, JOINT CENTER FOR ARTIFICIAL PHOTOSYNTHESIS COLLABORATION — Plasmonic resonances provide a promising pathway for efficiently capturing photons from solar radiation and improving photo-catalytic activity via hot carrier generation. Previous calculations have provided the prompt energy-momentum distributions of hot carriers, but have left open the question of their transport to collection surfaces [Accepted in Nature Communications]. As the overall efficiency of plasmonic devices is dependent not just on how many carriers are collected but also on their energy distribution, a transport model which tracks this distribution is of key importance. Here, we provide a first-principles model of this transport based upon at the linearized Boltzmann equation with the diffusive and ballistic regimes handled separately, and investigate the role of geometry on plasmonic hot carrier collection.

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