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Scattering graph method for 3D radiative transfer

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A method for monochromatic scalar 3D radiative transfer, designed primarily for modeling remote sensing imaging, is presented. For simulating an observation of an imaging satellite instrument, the method uses a heuristic scattering coupling function to model the inter-pixel scattering of radiation, which is represented with a graph. The GPU-capable code implementation of the method, TURSCA, was validated against two established 3D RT models, Siro and SHDOM, with relative agreement at 3% and 6%, respectively. The capabilities of TURSCA in modeling a satellite observation of an emission plume are examined. The presented method opens up unexplored avenues of research, especially in satellite-based remote sensing of atmospheres.