

# **Sparse Tensor Spherical Harmonics Approximation in Radiative Transfer**

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The stationary monochromatic radiative transfer equation is a partial differential transport equation stated on a five-dimensional phase space. To obtain a well-posed problem, inflow boundary conditions have to be prescribed.

We show that a sparse tensor product discretization of the radiative transfer problem can be combined with a spectral discretization of the angular domain using spherical harmonics. Neglecting boundary conditions we present estimates for the convergence rates of the sparse tensor product method which are essentially equal to the full tensor product method up to logarithmic factors. For the case with boundary conditions, we propose a splitting of the physical function space and a conforming tensorization. Numerical experiments in two physical and one angular dimension show evidence for the theoretical convergence rates in the latter case as well.