Radiative transfer in the forward-peaked regime

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In this lecture we present the radiative transfer equation in the forward-peaked regime in free space. We show instantaneous regularization of solutions using hypo-elliptic techniques, convergence of the Henyey-Greenstein scattering models towards the peaked regime and time vanishing of solutions due to scattering. The analysis of the scattering operator is performed through elementary use of the stereographic projection, which renders a precise representation of the scattering mechanism in terms of a fractional Laplace-Beltrami operator on the sphere.