

**TRANSIENT VECTOR RADIATIVE TRANSFER IN ONE-DIMENSIONAL
SCATTERING MEDIA BY THE NATURAL ELEMENT METHOD**

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ABSTRACT. The propagation of a polarized pulse in a Mie scattering atmosphere is investigated using the natural element method (NEM) to solve the transient vector radiative transfer. The NEM discretization scheme for the transient vector transfer equation is presented in detail. The performance and accuracy of the natural element method for transient vector radiative transfer in the scattering media is checked firstly. Afterwards, a square pulse transport in the atmosphere with Mie scattering media is examined. The time-resolved degree of polarization, degree of linear polarization, degree of the circular polarization and angular distributions of the Stokes vector are presented and analyzed.