

THE ROLE OF RAY EFFECTS AND FALSE SCATTERING ON THE ACCURACY OF THE STANDARD AND MODIFIED DISCRETE ORDINATES METHODS

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ABSTRACT. Ray effects and false scattering are two major sources of inaccuracy of the discrete ordinates method. High order schemes may reduce false scattering, and the modified discrete ordinates method may mitigate ray effects. Although the origin of the two errors is different, there is an interaction between them, since they tend to compensate each other. It is shown that decreasing one of the errors while keeping the other unchanged may decrease the solution accuracy because the compensation effect disappears. It is also shown that the modified discrete ordinates method does not decrease ray effects caused by sharp gradients of the temperature of the medium. A new version is proposed that successfully mitigates ray effects in that case.