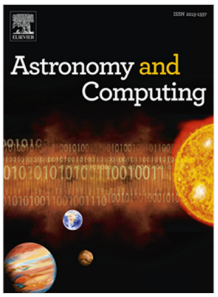
Accepted Manuscript



Three-dimensional heuristic radiation transfer method based on enumeration using the directions grid

S.G. Shulman

PII: S2213-1337(17)30094-X
DOI: https://doi.org/10.1016/j.ascom.2018.06.002
Reference: ASCOM 232

To appear in: *Astronomy and Computing*

Received date : 4 August 2017
Accepted date : 14 June 2018

Please cite this article as: Shulman S.G., Three-dimensional heuristic radiation transfer method based on enumeration using the directions grid. *Astronomy and Computing* (2018), https://doi.org/10.1016/j.ascom.2018.06.002

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

ACCEPTED MANUSCRIPT

Three-dimensional heuristic radiation transfer method based on enumeration using the directions grid

S. G. Shulman*

St Petersburg State University, 7-9 Universitetskaya Nab., St Petersburg, 199034, Russia

Pulkovo Astronomical Observatory of RAS, 65/1 Pulkovskoye Chaussee, St Petersburg, 196140, Russia

Abstract

In this study, we present an effective three-dimensional dust radiation transfer method based on enumeration using the directions grid and the law of total probability. The method is suitable for several simple problems. These problems are solved with different grades of direction sampling and by considering various photon scattering numbers. The polarization is calculated together with the photometry. The results obtained with the proposed method were compared with those produced by Monte-Carlo modeling. Both methods use the same physical and geometrical models. The results were obtained with one testing program, which allowed detailed comparisons of the results in terms of their quality and time rate. The analysis of multiple scattering was conducted carefully because considering all of the scattering results may be similar to the results obtained by single scattering modeling.

Keywords: circumstellar matter, methods: numerical, polarization, radiative transfer, scattering

1. Introduction

Radiation transfer is one of the most common astrophysical problems. It is necessary to calculate the radiative transfer in order to obtaining trustworthy

*Corresponding author
Email address: sgshulman@gmail.com (S. G. Shulman)

Download English Version:

https://daneshyari.com/en/article/6905921

Download Persian Version:

https://daneshyari.com/article/6905921

Daneshyari.com