Physics 239
Radiative Processes in Astrophysics

Lecture #7: Project info
then: Thompson & Rayleigh scattering

Final Project

Final project = 4-5 page writeup plus 10 minute presentation on a radiative processes topic of your choice

Abstract & Bibliography due 10/28 (11 days from now)

Final Project

What are the goals of this project?

1) outline the key physics for an important radiative process
2) review the literature on this subject in that field
3) describe key techniques or measurements relevant to the radiative process in question

You might want to look at topics we haven't yet covered:
e.g synchrotron radiation, inverse Compton scattering,
forbidden transitions, Faraday rotation & more

Final Project

Some ideas I might come up with:

- radiative transfer modeling of dust emission from galaxies
- Zeeman splitting to measure B-fields in molecular clouds
- using Faraday rotation to map the Galactic B-field
- optical properties of dust grains & Mie scattering

Final Project

- radiative transfer modeling of dust emission from galaxies

For bibliography, I encourage you to dig as deeply as you'd like, but please provide at least 3 references (at least 1 "classic" and 1 recent).

SAO/NASA ADS Astronomy Query Form for Mon Oct 17 15:01:40 2016

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Databases to query: ☑ Astronomy ☐ Physics ☑ arXiv e-prints

Authors: (Last, First M, one per line) ☑ SIMBAD ☑ NED ☑ ADS Objects

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☐ Require author for selection — ☐ Require object for selection

(● OR ○ AND ○ simple logic) (Combine with: ● OR ○ AND)

Publication Date between (MM) (YYYY) and (MM) (YYYY)

Enter Title Words ☐ Require title for selection

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Enter Abstract Words/Keywords ☐ Require text for selection

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dust radiative transfer galaxies

Return 200 items starting with number 1

SORTING

- ○ Sort by score
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- ○ Sort by first author name
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- ○ Sort by date (most recent first)
- ○ Sort by date (oldest first)
- ○ Sort by entry date
- ○ Sort by page (ToC sort)

Search within articles using ADS Bumblebee

Title:	Dust and the transfer of stellar radiation within galaxies
Authors:	Witt, Adolf N.; Thronson, Harley A., Jr.; Capuano, John M., Jr.
Affiliation:	AA(Ritter Observatory, Toledo, OH), AB(Wyoming Infrared Observatory, Laramie; Royal Observatory, Edinburgl
Publication:	Astrophysical Journal, Part 1 (ISSN 0004-637X), vol. 393, no. 2, July 10, 1992, p. 611-630. (ApJ Homepage)
Publication Date:	07/1992
Category:	Astrophysics
Origin:	STI
NASA/STI Keywords:	Active Galactic Nuclei, Cosmic Dust, Elliptical Galaxies, Quasars, Radiative Transfer, Starburst Galaxies, Interste Radiation, Ultraviolet Radiation
DOI:	10.1086/171530
Bibliographic Code:	1992ApJ...393..611W

Abstract

Models for the transfer of ultraviolet, visual, and near-infrared radiation within a variety of spherical geometries are presented which are environments within galaxies. Objects approximated by these models include normal and 'starbust galaxies', active galactic nuclei and Q interstellar medium, and elliptical galaxies. The models are based on a complete spherically symmetric 3D Monte Carlo simulation whic

Title: HERschel Observations of Edge-on Spirals (HEROES). III. Dust energy balance study of IC 2531

Authors: Mosenkov, Aleksandr V.; Allaert, Flor; Baes, Maarten; Bianchi, Simone; Camps, Peter; De Geyter, Gert; De Looze, Ilse; Fritz, Jacopo; Gentile, Gianfranco; Hughes, Thomas M.; Lewis, Fraser; Verstappen, Joris; Verstocken, Sam; Viaene, Sébastien

Affiliation: AA(Sterrenkundig Observatorium, Universiteit Gent, Krijgslaan 281, 9000, Gent, Belgium Aleksandr.Mosenkov@UGent.be; St. Petersburg State University, Universitetskij pr. 28, 198504 St. Petersburg, Stary Peterhof, Russia; Central Astronomical Observatory of RAS, Pulkovskoye chaussee 65/1, 196140, St. Petersburg, Russia), AB(Sterrenkundig Observatorium, Universiteit Gent, Krijgslaan 281, 9000, Gent, Belgium) AC(Sterrenkundig Observatorium, Universiteit Gent, Krijgslaan 281, 9000, Gent, Belgium), AD(Dipartimento di Matematica e Fisica, Università degli Studi Roma Tre, Via della Vasca Navale 84, 00146, Roma, Ital AE(Sterrenkundig Observatorium, Universiteit Gent, Krijgslaan 281, 9000, Gent, Belgium), AF(Sterrenkundig Observatorium, Universiteit Gent, Krijgslaan 281, 9000, Gent, Belgium), AG(Department of Physics a Astronomy, University College London, Gower Street, London, WC1E 6BT, UK; Sterrenkundig Observatorium, Universiteit Gent, Krijgslaan 281, 9000, Gent, Belgium), AH(Instituto de Radioastronomía y Astrofísica, CRyA, UNAM, Campus Morelia, A.P. 3-72, 58089, Michoacán, Mexico), AI(Sterrenkundig Observatorium, Universiteit Gent, Krijgslaan 281, 9000, Gent, Belgium; Department of Physics and Astrophysics, Vrije Universiteit Brussel, Pleinlaan 2, 1050, Brussels, Belgium), AJ(Instituto de Física y Astronomía, Universidad de Valparaíso, Avda. Gran Bretaña 1111, Valparaíso, Chile), AK(Faulkes Telescope Project, Cardiff University, The Parade, Cardiff CF24 3AA, Cardiff, UK; Astrophysics Research Institute, Liverpool John Moores University, IC2, Liverpool Science Park, 146 Brownlow Hill, Liverpool, L3 5RF, U AL(Kapteyn Astronomical Institute, University of Groningen, Landleven 12, 9747 AD, Groningen, The Netherlands), AM(Sterrenkundig Observatorium, Universiteit Gent, Krijgslaan 281, 9000, Gent, Belgium), AN(Sterrenkundig Observatorium, Universiteit Gent, Krijgslaan 281, 9000, Gent, Belgium)

Publication: Astronomy & Astrophysics, Volume 592, id.A71, 15 pp. (A&A Homepage)
Publication Date: 07/2016
Origin: EDP Sciences
Astronomy Keywords: radiative transfer, dust, extinction, galaxies: ISM, infrared: ISM
DOI: 10.1051/0004-6361/201628676
Bibliographic Code: 2016A&A...592A..71M

Abstract

We investigate the dust energy balance for the edge-on galaxy IC 2531, one of the seven galaxies in the HEROES sample. We perform a state-of-the-art radiative transfer modelling based, for the first time, on a set of optical and ne infrared galaxy images. We show that by taking into account near-infrared imaging in the modelling significantly improves the constraints on the retrieved parameters of the dust content. We confirm the result from previous studies that including a young stellar population in the modelling is important to explain the observed stellar energy distribution. However, the discrepancy between the observed and modelled thermal emission at far-infrared wavelengths,

Recent should be something within the last few years.

Final Project

- radiative transfer modeling of dust emission from galaxies

For bibliography, I encourage you to dig as deeply as you'd like, but please provide at least 3 references (at least 1 "classic" and 1 recent).

Try to make these wise choices because you will need to read them thoroughly and you don't want it to be a waste of time!

list can (and maybe should!) be revised as you read more

Final Project

In the abstract:

1) describe the radiative processes problem,

2) explain why it is important for current research in the field,

3) highlight some of the issues brought up in the recent literature