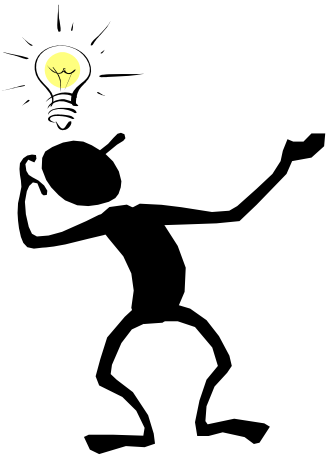
Introduction to Abstract Appreciation



Unusually Dense Crystal Packings of Ellipsoids

In this Letter, we report on the densest-known packings of congruent ellipsoids. The family of new packings consists of crystal arrangements of spheroids with a wide range of aspect ratios, and with density φ always surpassing that of the densest Bravais lattice packing $\varphi \approx 0.7405$. A remarkable maximum density of $\phi \approx 0.7707$ is achieved for maximal aspect ratios larger than $\sqrt{3}$, when each ellipsoid has 14 touching neighbors. Our results are directly relevant to understanding the equilibrium behavior of systems of hard ellipsoids, and, in particular, the solid and glassy phases.

Effective Scientific Abstracts

One of the first, and most important, things you will need to write as a grad student, postdoc, etc., is a scientific abstract!

Scientific abstracts are written for:

- Conferences and Workshops (e.g., APS April and March Meetings) you plan to attend
- Proposals you will write
- Journal articles you will write
- Prelim papers and theses you will write
- Seminars and Colloquia you will give

Effective Scientific Abstracts

The abstract provides an overview of the motivations, methods, and results in your paper or presentation

One function of an abstract is to “advertise” your paper or presentation:

Because the abstract is generally the first thing the reader will see, the quality of your abstract helps determine whether the reader will read your paper or attend your talk!

Because abstracts are often published or available online, abstracts also function as a permanent record of your paper or presentation

Published abstract booklets
Talk abstracts posted on-line
Paper abstracts available on INSPEC, SCOPUS, WOS,…

Scientific Abstracts

The abstract gives the reader an overview of the key motivations, methods, and results of the proposed research

The abstract should contain (in this order):

1. A brief statement of the motivations and/or issues associated with the research
2. A short description of the methods used
3. A summary of the key results obtained
4. A statement of the implications of the key results

Example Scientific Abstract

PRL 107, 117401 (2011) PHYSICAL REVIEW LETTERS week ending 9 SEPTEMBER 2011

Optical Response of Relativistic Electrons in the Polar BiTeI Semiconductor

J. S. Lee,[1,*] G. A. H. Schober,[2,3] M. S. Bahramy,[4] H. Murakawa,[5] Y. Onose,[2,5] R. Arita,[2,4] N. Nagaosa,[2,4] and Y. Tokura[1,2,4,5]

The transitions between the spin-split bands by spin-orbit interaction are relevant to many novel phenomena such as the resonant dynamical magnetoelectric effect and the spin Hall effect. We perform optical spectroscopy measurements combined with first-principles calculations to study these transitions in the recently discovered giant bulk Rashba spin-splitting system BiTeI. Several novel features are observed in the optical spectra of the material including a sharp edge singularity due to the reduced dimensionality of the joint density of states and a systematic doping dependence of the intraband transitions between the Rashba-split branches. These confirm the bulk nature of the Rashba-type splitting in BiTeI and manifest the relativistic nature of the electron dynamics in a solid.

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Motivation

The transitions between the spin-split bands by spin-orbit interaction are relevant to many novel phenomena such as the resonant dynamical magnetoelectric effect and the spin Hall effect. We perform optical spectroscopy measurements combined with first-principles calculations to study these transitions in the recently discovered giant bulk Rashba spin-splitting system BiTeI. Several novel features are observed in the optical spectra of the material including a sharp edge singularity due to the reduced dimensionality of the joint density of states and a systematic doping dependence of the intraband transitions between the Rashba-split branches. These confirm the bulk nature of the Rashba-type splitting in BiTeI and manifest the relativistic nature of the electron dynamics in a solid.

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Methods used

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Brief summary of key results

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Brief statement of implications of results

Celia Elliott's Abstract Recipe

Generate your abstract by answering the following questions, in one or two sentences each:

- What problem did you study and why is it important?
- What methods did you use?
- What were your principal results?
- What conclusions can you draw from your results, or what are the implications of your results?

Make your sentences as *specific* and *quantitative* as possible!!

More Advice from Celia

Control the length of your abstract by controlling the length of your answers to the four questions, NOT by omitting any of the answers:

Short abstract (~100 word, e.g., *Phys. Rev. Lett.* abstract):

one-sentence answers

Longer abstract (~200 word, e.g., *Phys. Review* abstract):

2-3 sentence answers

One-page abstract (e.g., proposal project summary):

one paragraph answers

Additional Advice on the Abstract

Your scientific abstract:

Should involve well-developed, grammatical sentences and paragraphs

- Don’t take grammatical shortcuts just because it’s an abstract!

Should be understandable by a non-expert audience

- e.g., Avoid using specialized terms

Should be able to stand alone from the paper

- Don’t refer to figures in paper
- Don’t include references
- Define all acronyms

Should NOT contain complex equations, figures, tables

Should NOT contain information NOT in the paper