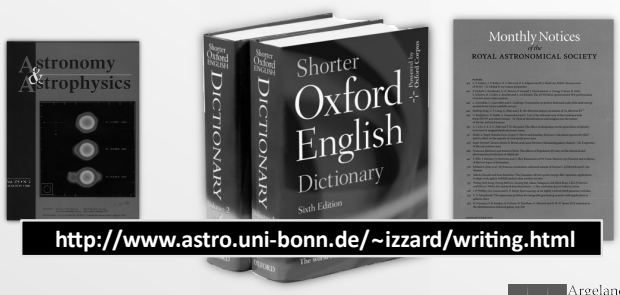
Scientific Writing 6951

Wednesdays 10-12 Room 0.008



http://www.astro.uni-bonn.de/~izzard/writing.html

Last time on *Scientific Writing*. . .

- Titles

  Informative Accurate Clear Concise Attention!

- The good:

- Surface Brightness Profiles of Seyfert Galaxies
- KOI-1299 b: a massive planet in a highly eccentric orbit transiting a red giant
- Observing Ultra-High Energy Cosmic Rays with Smartphones

Last time on *Scientific Writing*. . .

- Titles

  Informative Accurate Clear Concise Attention!

- The bad:

- Spectroscopic confirmation of KOI-1299b: a massive warm Jupiter in a 52-day eccentric orbit around a giant star
- Seventy-two new non-eclipsing BEER binaries discovered in CoRoT lightcurves and confirmed by RVs from AAOmega
- Results from BASS, the BANYAN All-Sky Survey

Last time on *Scientific Writing*. . .

- Titles

  Informative Accurate Clear Concise Attention!

- And the ~~ugly~~ very bad:

- Consistent system of oscillator strengths of $A^2\Delta - X^2\Pi(0,0)$ and $B^2\Sigma^- - X^2\Pi(0,0)$ bands of CH molecule
- Six newly-discovered hot Jupiters transiting F/G stars: WASP-87b, WASP-108b, WASP-109b, WASP-110b, WASP-111b and WASP-112b

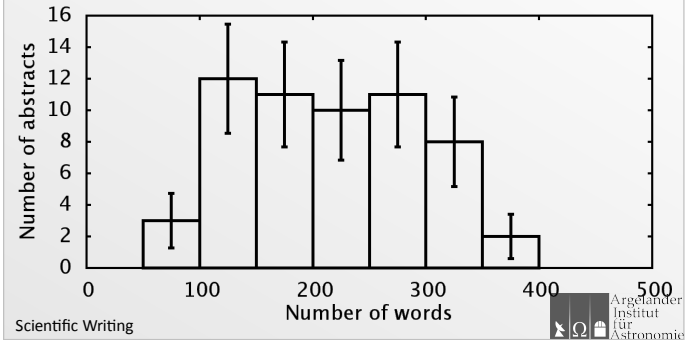
The Abstract

- A short description of the work
  - **Objectives**, scope
  - **Methods**
  - **Results** summary
  - Main **conclusion**(s)

The Abstract

- Short = less than 300 words,

  aim for about **150-250**!



The Abstract

- Short = less than 300 words,

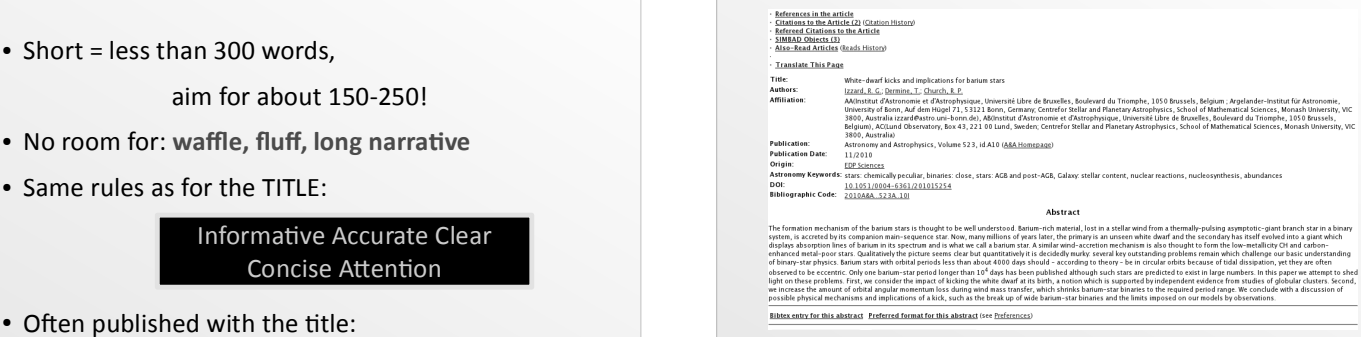
  aim for about 150-250!
- No room for: **waffle, fluff, long narrative**
- Same rules as for the TITLE:

  Informative Accurate Clear Concise Attention
- Often published with the title:

  may be your only chance to sell your work!

Argelander Institut für Astronomie

Astrophysics Data System



· References in the article
· Citations to the Article (2) (Citation History)
· Refereed Citations to the Article
· SIMBAD Objects (3)
· Also-Read Articles (Reads History)

· Translate This Page

Title: White-dwarf kicks and implications for barium stars
Authors: Izzard, R. G.; Dermine, T.; Church, R. P.
Affiliation: AA(Institut d'Astronomie et d'Astrophysique, Université Libre de Bruxelles, Boulevard du Triomphe, 1050 Brussels, Belgium ; Argelander-Institut für Astronomie, University of Bonn, Auf dem Hügel 71, 53121 Bonn, Germany; CentreFor Stellar and Planetary Astrophysics, School of Mathematical Sciences, Monash University, VIC 3800, Australia izzard@astro.uni-bonn.de), AB(Institut d'Astronomie et d'Astrophysique, Université Libre de Bruxelles, Boulevard du Triomphe, 1050 Brussels, Belgium), AC(Lund Observatory, Box 43, 221 00 Lund, Sweden; CentreFor Stellar and Planetary Astrophysics, School of Mathematical Sciences, Monash University, VIC 3800, Australia)
Publication: Astronomy and Astrophysics, Volume 523, id.A10 (A&A Homepage)
Publication Date: 11/2010
Origin: EDP Sciences
Astronomy Keywords: stars: chemically peculiar, binaries: close, stars: AGB and post-AGB, Galaxy: stellar content, nuclear reactions, nucleosynthesis, abundances
DOI: 10.1051/0004-6361/201015254
Bibliographic Code: 2010A&A...523A.10I

Abstract

The formation mechanism of the barium stars is thought to be well understood. Barium-rich material, lost in a stellar wind from a thermally-pulsing asymptotic-giant branch star in a binary system, is accreted by its companion main-sequence star. Now, many millions of years later, the primary is an unseen white dwarf and the secondary has itself evolved into a giant which displays absorption lines of barium in its spectrum and is what we call a barium star. A similar wind-accretion mechanism is also thought to form the low-metallicity CH and carbon-enhanced metal-poor stars. Qualitatively the picture seems clear but quantitatively it is decidedly murky: several key outstanding problems remain which challenge our basic understanding of binary-star physics. Barium stars with orbital periods less than about 4000 days should – according to theory – be in circular orbits because of tidal dissipation, yet they are often observed to be eccentric. Only one barium-star period longer than 10^4 days has been published although such stars are predicted to exist in large numbers. In this paper we attempt to shed light on these problems. First, we consider the impact of kicking the white dwarf at its birth, a notion which is supported by independent evidence from studies of globular clusters. Second, we increase the amount of orbital angular momentum loss during wind mass transfer, which shrinks barium-star binaries to the required period range. We conclude with a discussion of possible physical mechanisms and implications of a kick, such as the break up of wide barium-star binaries and the limits imposed on our models by observations.

Bibtex entry for this abstract Preferred format for this abstract (see Preferences)

Argelander Institut für Astronomie

Astrophysics Data System

· References in the article
· Citations to the Article (2) (Citation History)
· Refereed Citations to the Article
· SIMBAD Objects (3)
· Also-Read Articles (Reads History)

· Translate This Page

Title: White-dwarf kicks and implications for barium stars
Authors: Izzard, R. G.; Dermine, T.; Church, R. P.
Affiliation: AA(Institut d'Astronomie et d'Astrophysique, Université Libre de Bruxelles, Boulevard du Triomphe, 1050 Brussels, Belgium ; Argelander-Institut für Astronomie, University of Bonn, Auf dem Hügel 71, 53121 Bonn, Germany; CentreFor Stellar and Planetary Astrophysics, School of Mathematical Sciences, Monash University, VIC 3800, Australia izzard@astro.uni-bonn.de), AB(Institut d'Astronomie et d'Astrophysique, Université Libre de Bruxelles, Boulevard du Triomphe, 1050 Brussels, Belgium), AC(Lund Observatory, Box 43, 221 00 Lund, Sweden; CentreFor Stellar and Planetary Astrophysics, School of Mathematical Sciences, Monash University, VIC 3800, Australia)
Publication: Astronomy and Astrophysics, Volume 523, id.A10 (A&A Homepage)
Publication Date: 11/2010
Origin: EDP Sciences
Astronomy Keywords: stars: chemically peculiar, binaries: close, stars: AGB and post-AGB, Galaxy: stellar content, nuclear reactions, nucleosynthesis, abundances
DOI: 10.1051/0004-6361/201015254
Bibliographic Code: 2010A&A...523A.10I

Abstract

The formation mechanism of the barium stars is thought to be well understood. Barium-rich material, lost in a stellar wind from a thermally-pulsing asymptotic-giant branch star in a binary system, is accreted by its companion main-sequence star. Now, many millions of years later, the primary is an unseen white dwarf and the secondary has itself evolved into a giant which displays absorption lines of barium in its spectrum and is what we call a barium star. A similar wind-accretion mechanism is also thought to form the low-metallicity CH and carbon-enhanced metal-poor stars. Qualitatively the picture seems clear but quantitatively it is decidedly murky: several key outstanding problems remain which challenge our basic understanding of binary-star physics. Barium stars with orbital periods less than about 4000 days should – according to theory – be in circular orbits because of tidal dissipation, yet they are often observed to be eccentric. Only one barium-star period longer than 10^4 days has been published although such stars are predicted to exist in large numbers. In this paper we attempt to shed light on these problems. First, we consider the impact of kicking the white dwarf at its birth, a notion which is supported by independent evidence from studies of globular clusters. Second, we increase the amount of orbital angular momentum loss during wind mass transfer, which shrinks barium-star binaries to the required period range. We conclude with a discussion of possible physical mechanisms and implications of a kick, such as the break up of wide barium-star binaries and the limits imposed on our models by observations.

Bibtex entry for this abstract Preferred format for this abstract (see Preferences)

Title

Argelander Institut für Astronomie

Astrophysics Data System

· References in the article
· Citations to the Article (2) (Citation History)
· Refereed Citations to the Article
· SIMBAD Objects (3)
· Also-Read Articles (Reads History)

· Translate This Page

Title: White-dwarf kicks and implications for barium stars
Authors: Izzard, R. G.; Dermine, T.; Church, R. P.
Affiliation: AA(Institut d'Astronomie et d'Astrophysique, Université Libre de Bruxelles, Boulevard du Triomphe, 1050 Brussels, Belgium ; Argelander-Institut für Astronomie, University of Bonn, Auf dem Hügel 71, 53121 Bonn, Germany; CentreFor Stellar and Planetary Astrophysics, School of Mathematical Sciences, Monash University, VIC 3800, Australia izzard@astro.uni-bonn.de), AB(Institut d'Astronomie et d'Astrophysique, Université Libre de Bruxelles, Boulevard du Triomphe, 1050 Brussels, Belgium), AC(Lund Observatory, Box 43, 221 00 Lund, Sweden; CentreFor Stellar and Planetary Astrophysics, School of Mathematical Sciences, Monash University, VIC 3800, Australia)
Publication: Astronomy and Astrophysics, Volume 523, id.A10 (A&A Homepage)
Publication Date: 11/2010
Origin: EDP Sciences
Astronomy Keywords: stars: chemically peculiar, binaries: close, stars: AGB and post-AGB, Galaxy: stellar content, nuclear reactions, nucleosynthesis, abundances
DOI: 10.1051/0004-6361/201015254
Bibliographic Code: 2010A&A...523A.10I

Abstract

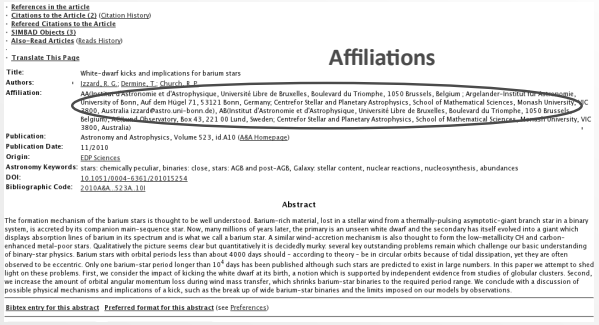
The formation mechanism of the barium stars is thought to be well understood. Barium-rich material, lost in a stellar wind from a thermally-pulsing asymptotic-giant branch star in a binary system, is accreted by its companion main-sequence star. Now, many millions of years later, the primary is an unseen white dwarf and the secondary has itself evolved into a giant which displays absorption lines of barium in its spectrum and is what we call a barium star. A similar wind-accretion mechanism is also thought to form the low-metallicity CH and carbon-enhanced metal-poor stars. Qualitatively the picture seems clear but quantitatively it is decidedly murky: several key outstanding problems remain which challenge our basic understanding of binary-star physics. Barium stars with orbital periods less than about 4000 days should – according to theory – be in circular orbits because of tidal dissipation, yet they are often observed to be eccentric. Only one barium-star period longer than 10^4 days has been published although such stars are predicted to exist in large numbers. In this paper we attempt to shed light on these problems. First, we consider the impact of kicking the white dwarf at its birth, a notion which is supported by independent evidence from studies of globular clusters. Second, we increase the amount of orbital angular momentum loss during wind mass transfer, which shrinks barium-star binaries to the required period range. We conclude with a discussion of possible physical mechanisms and implications of a kick, such as the break up of wide barium-star binaries and the limits imposed on our models by observations.

Bibtex entry for this abstract Preferred format for this abstract (see Preferences)

Authors

Argelander Institut für Astronomie

Astrophysics Data System



· References in the article
· Citations to the Article (2) (Citation History)
· Refereed Citations to the Article
· SIMBAD Objects (3)
· Also-Read Articles (Reads History)

· Translate This Page

Title: White-dwarf kicks and implications for barium stars
Authors: Izzard, R. G.; Dermine, T.; Church, R. P.
Affiliation: AA(Institut d'Astronomie et d'Astrophysique, Université Libre de Bruxelles, Boulevard du Triomphe, 1050 Brussels, Belgium ; Argelander-Institut für Astronomie, University of Bonn, Auf dem Hügel 71, 53121 Bonn, Germany; CentreFor Stellar and Planetary Astrophysics, School of Mathematical Sciences, Monash University, VIC 3800, Australia izzard@astro.uni-bonn.de), AB(Institut d'Astronomie et d'Astrophysique, Université Libre de Bruxelles, Boulevard du Triomphe, 1050 Brussels, Belgium), ACLund Observatory, Box 43, 221 00 Lund, Sweden; CentreFor Stellar and Planetary Astrophysics, School of Mathematical Sciences, Monash University, VIC 3800, Australia)
Publication: Astronomy and Astrophysics, Volume 523, id.A10 (A&A Homepage)
Publication Date: 11/2010
Origin: EDP Sciences
Astronomy Keywords: stars: chemically peculiar, binaries: close, stars: AGB and post-AGB, Galaxy: stellar content, nuclear reactions, nucleosynthesis, abundances
DOI: 10.1051/0004-6361/201015254
Bibliographic Code: 2010A&A...523A.10I

Abstract

The formation mechanism of the barium stars is thought to be well understood. Barium-rich material, lost in a stellar wind from a thermally-pulsing asymptotic-giant branch star in a binary system, is accreted by its companion main-sequence star. Now, many millions of years later, the primary is an unseen white dwarf and the secondary has itself evolved into a giant which displays absorption lines of barium in its spectrum and is what we call a barium star. A similar wind-accretion mechanism is also thought to form the low-metallicity CH and carbon-enhanced metal-poor stars. Qualitatively the picture seems clear but quantitatively it is decidedly murky: several key outstanding problems remain which challenge our basic understanding of binary-star physics. Barium stars with orbital periods less than about 4000 days should – according to theory – be in circular orbits because of tidal dissipation, yet they are often observed to be eccentric. Only one barium-star period longer than 10^4 days has been published although such stars are predicted to exist in large numbers. In this paper we attempt to shed light on these problems. First, we consider the impact of kicking the white dwarf at its birth, a notion which is supported by independent evidence from studies of globular clusters. Second, we increase the amount of orbital angular momentum loss during wind mass transfer, which shrinks barium-star binaries to the required period range. We conclude with a discussion of possible physical mechanisms and implications of a kick, such as the break up of wide barium-star binaries and the limits imposed on our models by observations.

Bibtex entry for this abstract Preferred format for this abstract (see Preferences)

Affiliations

Argelander Institut für Astronomie

Astrophysics Data System

· References in the article
· Citations to the Article (2) (Citation History)
· Refereed Citations to the Article
· SIMBAD Objects (3)
· Also-Read Articles (Reads History)

· Translate This Page

Title: White-dwarf kicks and implications for barium stars
Authors: Izzard, R. G.; Dermine, T.; Church, R. P.
Affiliation: AA(Institut d'Astronomie et d'Astrophysique, Université Libre de Bruxelles, Boulevard du Triomphe, 1050 Brussels, Belgium ; Argelander-Institut für Astronomie, University of Bonn, Auf dem Hügel 71, 53121 Bonn, Germany; CentreFor Stellar and Planetary Astrophysics, School of Mathematical Sciences, Monash University, VIC 3800, Australia izzard@astro.uni-bonn.de), AB(Institut d'Astronomie et d'Astrophysique, Université Libre de Bruxelles, Boulevard du Triomphe, 1050 Brussels, Belgium), ACLund Observatory, Box 43, 221 00 Lund, Sweden; CentreFor Stellar and Planetary Astrophysics, School of Mathematical Sciences, Monash University, VIC 3800, Australia)
Publication: Astronomy and Astrophysics, Volume 523, id.A10 (A&A Homepage)
Publication Date: 11/2010
Origin: EDP Sciences
Astronomy Keywords: stars: chemically peculiar, binaries: close, stars: AGB and post-AGB, Galaxy: stellar content, nuclear reactions, nucleosynthesis, abundances
DOI: 10.1051/0004-6361/201015254
Bibliographic Code: 2010A&A...523A.10I

Abstract

The formation mechanism of the barium stars is thought to be well understood. Barium-rich material, lost in a stellar wind from a thermally-pulsing asymptotic-giant branch star in a binary system, is accreted by its companion main-sequence star. Now, many millions of years later, the primary is an unseen white dwarf and the secondary has itself evolved into a giant which displays absorption lines of barium in its spectrum and is what we call a barium star. A similar wind-accretion mechanism is also thought to form the low-metallicity CH and carbon-enhanced metal-poor stars. Qualitatively the picture seems clear but quantitatively it is decidedly murky: several key outstanding problems remain which challenge our basic understanding of binary-star physics. Barium stars with orbital periods less than about 4000 days should – according to theory – be in circular orbits because of tidal dissipation, yet they are often observed to be eccentric. Only one barium-star period longer than 10^4 days has been published although such stars are predicted to exist in large numbers. In this paper we attempt to shed light on these problems. First, we consider the impact of kicking the white dwarf at its birth, a notion which is supported by independent evidence from studies of globular clusters. Second, we increase the amount of orbital angular momentum loss during wind mass transfer, which shrinks barium-star binaries to the required period range. We conclude with a discussion of possible physical mechanisms and implications of a kick, such as the break up of wide barium-star binaries and the limits imposed on our models by observations.

Bibtex entry for this abstract Preferred format for this abstract (see Preferences)

Journal:
Volume, Page, Date

Argelander Institut für Astronomie

Astrophysics Data System

· References in the article
· Citations to the Article (2) (Citation History)
· Refereed Citations to the Article
· SIMBAD Objects (3)
· Also-Read Articles (Reads History)

· Translate This Page

Title: White-dwarf kicks and implications for barium stars
Authors: Izzard, R. G.; Dermine, T.; Church, R. P.
Affiliation: AA(Institut d'Astronomie et d'Astrophysique, Université Libre de Bruxelles, Boulevard du Triomphe, 1050 Brussels, Belgium ; Argelander-Institut für Astronomie, University of Bonn, Auf dem Hügel 71, 53121 Bonn, Germany; CentreFor Stellar and Planetary Astrophysics, School of Mathematical Sciences, Monash University, VIC 3800, Australia izzard@astro.uni-bonn.de), AB(Institut d'Astronomie et d'Astrophysique, Université Libre de Bruxelles, Boulevard du Triomphe, 1050 Brussels, Belgium), AC(Lund Observatory, Box 43, 221 00 Lund, Sweden; CentreFor Stellar and Planetary Astrophysics, School of Mathematical Sciences, Monash University, VIC 3800, Australia)
Publication: Astronomy and Astrophysics, Volume 523, id.A10 (A&A Homepage)
Publication Date: 11/2010
Origin: EDP Sciences
Astronomy Keywords: stars: chemically peculiar, binaries: close, stars: AGB and post-AGB, Galaxy: stellar content, nuclear reactions, nucleosynthesis, abundances
DOI: 10.1051/0004-6361/201015254
Bibliographic Code: 2010A&A...523A..10I

Abstract

Abstract

The formation mechanism of the barium stars is thought to be well understood. Barium-rich material, lost in a stellar wind from a thermally-pulsing asymptotic-giant branch star in a binary system, is accreted by its companion main-sequence star. Now, many millions of years later, the primary is an unseen white dwarf and the secondary has itself evolved into a giant which displays absorption lines of barium in its spectrum and is what we call a barium star. A similar wind-accretion mechanism is also thought to form the low-metallicity CH and carbon-enhanced metal-poor stars. Qualitatively the picture seems clear but quantitatively it is decidedly murky: several key outstanding problems remain which challenge our basic understanding of binary-star physics. Barium stars with orbital periods less than about 4000 days should – according to theory – be in circular orbits because of tidal dissipation, yet they are often observed to be eccentric. Only one barium-star period longer than 10^4 days has been published although such stars are predicted to exist in large numbers. In this paper we attempt to shed light on these problems. First, we consider the impact of kicking the white dwarf at its birth, a notion which is supported by independent evidence from studies of globular clusters. Second, we increase the amount of orbital angular momentum loss during wind mass transfer, which shrinks barium-star binaries to the required period range. We conclude with a discussion of possible physical mechanisms and implications of a kick, such as the break up of wide barium-star binaries and the limits imposed on our models by observations.

Bibtex entry for this abstract Preferred format for this abstract (see Preferences)

Abstract

The Abstract

- Indexed on search engines YAHOO! Google
- Our survey says: *everyone reads it!*
- So:
  - Make every sentence count
  - Avoid citations, acronyms, too much jargon
  - No figures, references, tables, equations
  - The abstract ***STANDS ON ITS OWN***!

(In plain text!)

One way to do it

- **1-2 sentences** for each of:
  - Topic, purpose, your research question
  - Methods and data analysis
  - Results and findings (present as facts!)
  - Conclusions
- Best to do this ***in one paragraph***
- A&A has an alternative "**structured abstract**"
- I cannot emphasise enough how much I ***HATE THE A&A ABSTRACT!***

A&A structured abstract

- Context
- Aims
- Methods
- Results
- Conclusions

Look familiar?

You are going to learn to write **proper abstracts** in the form of a paragraph (or two)!

Sentences and Paragraphs

- Every sentence has a beginning and an end.

Most important!

- Learn to join sentences by **theme**, **repetition** and **transitional devices**

Massive stars explode as supernovae. They are the biggest explosions in the Universe.

Massive stars explode as **supernovae. Supernovae** are the biggest explosions in the Universe.

Massive stars explode as supernovae **which are** the most violent explosions in the Universe.

Sentences and Paragraphs

- **Vary** sentence structure, **mix** up the phrasing, **avoid repetitive** form

  (You will see examples soon; also later classes on English language and style)
- Each paragraph should make **one point** and then **expand** upon it.
- The abstract seems an exception (several points?)
- But its one point is to ***introduce the article***

Sentences and Paragraphs

- Abstracts: *active* tense

  Active: **Massive stars** explode as supernovae.

  Passive: **Supernovae are** explosions of massive stars.

- Abstracts: *present* tense

  We **carried** out an experiment to measure the colour of a star.

  We **determine** the colour of a star.

- No **citations**
- No **very long sentences**
- No (or little) **jargon**
- No **useless words** or phrases!
- No **incomplete comparisons!**
- No negatives! No double negatives!

Much more on these later in the course

Abstracts Exercise

1) You have been given an abstract in "traditional form":

- Identify the components which make up the *A&A* abstract sections:

  Context Aims Methods Results Conclusions.

- Note also the sentence transitions and phrasing.

2) You have been given an abstract in "*A&A* form"

- Rewrite it in traditional form, i.e.

  one or two paragraphs of continuous text.

Abstracts Exercise

3) You have been given an abstract which is suboptimal :

can you improve it by rewriting it ?

Does it still make sense to your **neighbours**?

Homework 1: Keywords

- Assign a few **keywords** to each of the abstracts from the exercises

http://www.aanda.org/index2.php?option=com_content&task=view&id=170&Itemid=256

- Why are **keywords** useful?

Homework 2:

- Each group: choose a subject you **studied as an undergraduate** e.g.

  quantum mechanics, relativity, electrodynamics, brewing, distilling …

- Read up on this a little to refresh your knowledge e.g. read the **wikipedia** page