

# THE PORTUGUESE NEWSLETTER OF ASTRONOMY

## BOLETIM PORTUGUÊS DE ASTRONOMIA

No. 6 — February 2007

Nº 6 — Fevereiro 2007

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# 1 ABSTRACTS OF RECENTLY ACCEPTED PAPERS

## *Resumos de artigos aceites recentemente*

### **The Nature of the Dense Core Population in the Pipe Nebula: Core and Cloud Kinematics from C<sup>18</sup>O Observations**

Muench, A. A.<sup>1</sup>; Lada, Charles J.<sup>1</sup>; Rathborne, J.<sup>1</sup>; Alves, João<sup>2</sup>; Lombardi, M.<sup>3,4</sup>;

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<sup>2</sup> Calar Alto Observatory, Centro Astronómico Hispano Alemán, c/Jesús Durbán Remón 2-2, 04004 Almeria, Spain;

<sup>3</sup> European Southern Observatory, Karl-Schwarzschild-Strasse 2, 85748 Garching, Germany;

<sup>4</sup> University of Milan, Department of Physics, via Celoria 16, 20133 Milan, Italy;

We present molecular line observations of 94 dark cloud cores identified in the Pipe nebula through near-IR extinction mapping. Using the Arizona Radio Observatory 12m telescope, we obtained spectra of these cores in the J=1-0 transition of C<sup>18</sup>O. We used the measured core parameters,  $T_R^*$ ,  $\Delta v$ ,  $v_{lsr}$ , radius, and mass, to explore the internal kinematics of the cores, as well as their radial motions through the larger molecular cloud. We find that the vast majority of the dark extinction cores are true cloud cores, rather than the superposition of unrelated filaments. While we identify no significant correlations between the cores' internal gas motions and their other physical parameters, we identify spatially correlated radial velocity variations that outline two main kinematic components of the cloud. The largest is a 15 pc long filament that is surprisingly narrow both in spatial dimensions and in radial velocity. Beginning in the "Stem" of the Pipe, this filament displays uniformly small C<sup>18</sup>O line widths ( $\Delta v \sim 0.4 \text{ km s}^{-1}$ ), as well as core-to-core motions only slightly in excess of the gas sound speed. The second component outlines what appears to be part of a large (2 pc;  $10^3 M_{\text{solar}}$ ) ringlike structure. Cores associated with this component display both larger line widths and core-to-core motions than cores in the main cloud. The Pipe molecular ring may represent a primordial structure related to the formation of this cloud.

Accepted by: The Astrophysical Journal,

<http://arxiv.org/abs/0709.0523>

### **The Nature of the Dense Core Population in the Pipe Nebula: Thermal Cores Under Pressure**

Lada, Charles J.<sup>1</sup>; Muench, A. A.<sup>1</sup>; Rathborne, J.<sup>1</sup>; Alves, João<sup>2</sup>; Lombardi, M.<sup>3,4</sup>;

<sup>1</sup> Harvard-Smithsonian Center for Astrophysics, 60 Garden Street, Cambridge, MA 02138, USA;

<sup>2</sup> Calar Alto Observatory, Centro Astronómico Hispano Alemán, c/Jesús Durbán Remón 2-2, 04004 Almeria, Spain;

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<sup>4</sup> University of Milan, Department of Physics, via Celoria 16, 20133 Milan, Italy;

In this paper we present the results of a systematic investigation of an entire population of predominately starless dust cores within a single molecular cloud, the Pipe Nebula. Analysis of extinction data shows the cores to be dense objects characterized by a narrow range of density with a median value of  $n(\text{H}_2)=7 \times 10^3$ . The nonthermal velocity dispersions measured in molecular emission lines are found to be subsonic for the large majority of the cores and show no correlation with core mass (or size). Thermal pressure is found to be the dominate source of internal gas pressure and support for most of the core population. The total internal pressures of the cores are found to be roughly independent of core mass over the entire (0.2-20  $M_{\text{solar}}$ ) range of the core mass function (CMF) indicating that the cores are in pressure equilibrium with an external source of pressure. This external pressure is most likely provided by the weight of the surrounding molecular cloud. Most of the cores appear to be pressure confined, gravitationally unbound entities whose fundamental physical properties are determined by only a few factors, which include self-gravity, gas temperature, and the simple requirement of pressure equilibrium with the surrounding environment. The entire core population is found to be characterized by a single critical Bonnor-Ebert mass of approximately 2  $M_{\text{solar}}$ . This mass coincides with the characteristic mass of the Pipe CMF suggesting that the CMF (and ultimately the stellar IMF) has its origin in the physical process of thermal fragmentation in a pressurized medium.

## 2 NEW JOB AND SCHOLARSHIP OFFERS

### *Anúncios recentes de empregos e bolsas*

#### **SPARTAN Exchange visits**

Rui Azevedo ; E-mail contact: [razevedo@astro.up.pt](mailto:razevedo@astro.up.pt)

The Department of Physics and Astronomy at the University of Leicester has received funding of 1.6M euros to create a Centre of Excellence in the training of early stage researchers in Space, Planetary and Astrophysical Sciences. The SPARTAN programme provides a number of fellowships leading to PhD and MPhil degrees and supports exchange visits of between 3 to 6 months duration.

Applications are now invited for the next round of exchange programme visits, for the period March to December 2008. They will be dealt with as received and can be made at any time up to June 30th 2008. Applicants must be registered for a PhD or MPhil programme in a recognised higher education institution and should provide a one-page written case outlining the reasons for the proposed visit and the research that will be carried out together with a letter of endorsement from their supervisor. It is essential to make contact and agree the basic outline of the visit with a proposed collaborator in the department before submitting a formal application. A salary and travel expenses up to 2000 euros (approx 3000 euros) per month will be available. Visits are expected to be for a minimum of 3 months and maximum of 6 months. Further exchange visit opportunities will be announced at 6 monthly intervals until the end of the project in September 2009. Chosen areas of research can be within any of the space-related research groups within the department:

- X-ray and Observational Astronomy
- Theoretical Astronomy
- Radio and Space Plasma Physics
- Earth Observation Science
- Space Project Instrumentation

Further details of possible research projects, the Spartan programme and the Physics and Astronomy department can be found on the departmental website (<http://www.le.ac.uk/physics>) and the relevant group pages linked from there. Visit also the exchange programme website at: [http://www.le.ac.uk/physics/spartan\\_visits.shtml](http://www.le.ac.uk/physics/spartan_visits.shtml)

#### **ESO Vacancy Notices**

Paula Teixeira ; E-mail contact: [pteixeira@cfa.harvard.edu](mailto:pteixeira@cfa.harvard.edu)

To whom it may concern

Please find at <https://jobs.eso.org/> the recently released vacancy notices of

- Director for Science
- Head of Instrumentation Group
- Senior Advisor for International Relations
- European Project Manager - Head of ALMA Division

to be filled with the European Organisation for Astronomical Research in the Southern Hemisphere (ESO).

We would very much appreciate if these vacancy notices could be given wide publicity through your internal publication procedure.

ESO's other vacancies can be found at <https://jobs.eso.org/>.

Thank you in advance for your assistance, Angela Arndt

### **Postdoc in Asteroseismology - Orsay**

Paula Teixeira ; E-mail contact: [pteixeira@cfa.harvard.edu](mailto:pteixeira@cfa.harvard.edu)

The Institut d'Astrophysique Spatiale is offering a post doctoral fellowship in Asteroseismology. The candidate will be integrated in the Solar and Stellar Physics Department. The Department has been involved in the development of hardware, data analysis preparation and data archiving for the COROT mission.

The successful candidate will participate in the analysis of the COROT data for making inference, or for placing constraints, on the internal structure and dynamics of the observed stars, as well as for studying the stellar magnetic activity of the observed stars.

The contract will be set for one year, to renewed once for one year (2 years maximum) for net salary of at least 1860 euros per months (social security already deducted), depending on experience. The earliest starting date subject to negotiation shall be March 1st, 2008.

Applications, including a CV, a statement of research interest and recommendation letter(s) must be sent before 15th February 2008 by email to [Thierry.Appourchaux@ias.u-psud.fr](mailto:Thierry.Appourchaux@ias.u-psud.fr). Applicants are welcome to contact Thierry Appourchaux (+33-1-69-85-86-29).

## **3 MEETINGS AND CONFERENCES**

### *Reuniões e encontros*

#### **Frontiers in computational astrophysics: The origin of stars, planets and galaxies: Ascona, Switzerland, July 13-18 2008.**

Rui Azevedo ; E-mail contact: [razevedo@astro.up.pt](mailto:razevedo@astro.up.pt)

The conference will gather together experts in computational astrophysics from around the world to critically discuss and compare numerical techniques. We will review existing algorithms, discuss strengths & weaknesses of a given technique in regards to specific physical problems or astrophysical applications, discuss the state of the art simulations in that area and to look forward to future developments. The Ascona Conference Center in the Southern Alps has all modern facilities and is within walking distance of town with beautiful views over Lake Maggiore. Some travel/accommodation grants are available from the AstroSim program - you can apply on the registration page. Registration is now open and the conference web page is here: <http://www.astrosim.net/ascona2008/index.html>

Thank you, Ben Moore

## **ERASMUS INTENSIVE PROGRAM on Supercomputing and Numerical Techniques in Astrophysics Fluid Flow Modelling**

Paula Teixeira ; E-mail contact: pteixeira@cfa.harvard.edu

University of Evora, Portugal

4-23 February 2007

<http://www.lca.uevora.pt/ip-supercomputing>

This training school brings together, for the first time in Europe, graduate students, postdoctoral researchers and experienced European computational physicists and astrophysicists to discuss an integrated overview of the numerical and computational techniques that are most adequate to model different astrophysical fluid flow phenomena by means of supercomputing simulations.

The participants will attend theoretical and laboratory courses and a half-day Workshop per week on computational Astrophysics. On the third week the participants will develop a computational project that will make use of the supercomputer facility at the University of Coimbra.

Local Organizing Committee:

Miguel A. de Avillez (Chair, U. Evora)

Fernando L. Carapau (U. Evora)

Sandra M. Vinagre (U. Evora)

Scientific Organizing Committee:

Pedro Vieira Alberto (University of Coimbra)

Miguel A. de Avillez (Chair, University of Evora)

Dieter Breitschwerdt (University of Vienna)

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Ernst Dorfi (University of Vienna)

Michal Hanasz (Nicolaus Copernicus University)

Anders Johansen (Leiden University)

Francisco Neves (Politechnic Institute of Portalegre)

Orlando Oliveira (University of Coimbra)

Romain Teyssier (CEA Saclay)

Christian Theis (University of Vienna)

### **37th COSPAR Scientific Assembly**

Paula Teixeira ; E-mail contact: pteixeira@cfa.harvard.edu

Dear Colleague,

The 37th Scientific Assembly of the Committee on Space Research (COSPAR) will bring together about 2000 scientists and engineers from all over the world to present their latest results in more than 80 symposia and special events covering all areas of space science.

Montreal, Canada, 13-20 July 2008

Scientific program and abstract instructions:

<http://www.cospar-assembly.org/>

I am most pleased to invite you to attend a meeting on "Astroparticle Physics" that will be organized under the authority of the COSPAR Scientific Commission H on Fundamental Physics in Space (meeting H01). The main objective of this meeting will be to discuss the latest results in the area of astroparticle physics, its observational implications and experimental testing in space.

Please note the following dates:

- Abstract deadline: 17 February 2008

Registration and hotel reservations:

<http://www.cospas-assembly.org/>

- Early registration deadline: 1 June 2008

Please forward this message to colleagues who may be interested in participating in this meeting.

I am looking forward to your participation in the Assembly!

Yours sincerely,

Orfeu Bertolami

Main Scientific Organizer,

Meeting H01 on "Astroparticle Physics"

COSPAR Scientific Commission H: "Fundamental Physics in Space"

## **The 9th European VLBI Network Symposium on "The role of VLBI in the Golden Age for Radio Astronomy" and "EVN Users Meeting"**

Paula Teixeira ; E-mail contact: [pteixeira@cfa.harvard.edu](mailto:pteixeira@cfa.harvard.edu)

Bologna, Italy, September 23-26, 2008

First announcement

The Istituto di Radioastronomia (INAF) on behalf of the European VLBI Consortium, will host the "9th European VLBI Network Symposium on The role of VLBI in the Golden Age for Radio Astronomy" and the EVN Users Meeting on September 23-26 2008. The Symposium will be held in Bologna at the Conference Centre of the Consiglio Nazionale delle Ricerche and Istituto Nazionale di Astrofisica Campus, where the Istituto di Radioastronomia is located.

The purpose of this conference is to report on the very latest VLBI results, including both recent scientific and technical developments in an era during which several new powerful radio astronomy facilities, e.g. e-MERLIN, LOFAR, ALMA, SKA, etc..., are coming along.

The Scientific Organizing Committee is formed by the members of the EVN Consortium Board of Directors and by the past and present EVN Programme Committee Chairman.

The web page of the Symposium (<http://www.ira.inaf.it/meetings/evn9>) will be made available soon. The address to contact the LOC is [evn9@ira.inaf.it](mailto:evn9@ira.inaf.it)

The meeting will have an informal character and includes reviews, contributed papers and posters. The EVN Users Meeting will be held during the conference at the Medicina Radio Observatory Visitor Centre. Also the traditional football match will be organized (start your training).

Best regards, LOC

(Daniele Dallacasa, Marcello Giroletti, Karl-Heinz Mack, Franco Mantovani, Mauro Nanni, Barbara Neri, Carlo Stanghellini)

## **4 OTHER ANNOUNCEMENTS**

### *Outros anúncios*

#### **Summer Student Program at Space Telescope Science Institute**

Rui Azevedo ; E-mail contact: [razevedo@astro.up.pt](mailto:razevedo@astro.up.pt)

Each summer the Space Telescope Science Institute brings 15 to 20 students to Baltimore, Maryland, for our Summer Student Program (SSP). The SSP lasts ten weeks, from mid-June to mid-August. SSP students work with STScI researchers and staff one-on-one in projects ranging from astronomical research to science writing, software develop-

ment. and preparation of scientific data for public release. The SSP is oriented around upper division undergraduates, but we have had students from all academic levels and a broad variety of backgrounds. There are no restrictions on who may apply, and the SSP is open to foreign students.

Complete information may be found at: <http://www.stsci.edu/institute/sd/students>

Please note that the application deadline is February 20, 2008.