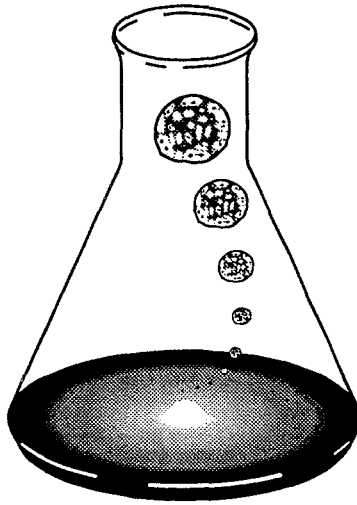


## **Program**

# **Conference on Chondrules and the Protoplanetary Disk**

**October 13–15, 1994  
Albuquerque, New Mexico**





**Conference on Chondrules and  
the Protoplanetary Disk  
October 13–15, 1994**

**Hosted by**

Institute of Meteoritics and Department of Earth and Planetary Sciences,  
University of New Mexico

**Sponsored by**

NASA's Origins of Solar Systems Program  
Lunar and Planetary Institute  
University of New Mexico

**Organizing Committee**

A. P. Boss	Carnegie Institution
P. Cassen	NASA Ames Research Center
R. H. Hewins, Program Chair	Rutgers University
R. H. Jones, Local Organizing Chair	University of New Mexico
A. E. Rubin	University of California, Los Angeles
E. R. D. Scott	University of Hawaii
J. T. Wasson	University of California, Los Angeles

## CONFERENCE INFORMATION

### Messages

Participants may be reached during the technical sessions by telephone at 505-277-2643 or by fax at 505-277-3577. Messages will be posted at the staff desk in Room 117. Sessions will not be interrupted to deliver messages, except in the event of an emergency.

### Shuttle Service

Shuttle service between the hotels and the conference sessions will be provided. The vans used for this service will have "Conference Shuttle" signs on the side windows and will be operated by UNM students. The vans will pick up in front of each hotel lobby and on campus at the Cornell Drive and Redondo Road corner of parking lot A. Maps of Albuquerque and the UNM campus will be available at the staff desk in Room 117. Two vans will operate between the hotels and the University campus on the following schedule. (Please note that the schedule may be altered beginning Thursday afternoon if use of the shuttle is greater or less than anticipated. Any change in the schedule will be announced at the beginning of the Thursday afternoon session, and copies of a revised schedule will be available at the staff desk in Room 117.)

#### **Wednesday, October 12**

6:45 p.m.–9:30 p.m.

(8:30 p.m. last pick up  
at the LeBaron)

Vans begin a route from the LeBaron  
to the Radisson for the reception at  
15-min intervals.

#### **Thursday, October 13**

7:30, 7:50, and 8:10 a.m.

6:20, 6:40, and 7:00 p.m.

Hotels to UNM  
UNM to the hotels

#### **Friday, October 14**

7:45, 8:00, and 8:15 a.m.

5:00, 5:20, and 5:40 p.m.

Hotels to UNM  
UNM to the hotels

#### **Saturday, October 15**

7:45, 8:00, and 8:15 a.m.

12:00, 12:15, and 12:30 p.m.

Hotels to UNM  
UNM to the hotels and airport

### **Institute of Meteoritics 50th Anniversary Activities**

The Chondrules Conference is being hosted by the Institute of Meteoritics in celebration of its 50th anniversary. Conference attendees are invited to participate in two events on Saturday, October 15. In the afternoon, there will be an Open House of the Institute of Meteoritics and Department of Earth and Planetary Sciences. The Meteorite and Geology Museums, as well as analytical laboratories, will be open from 1:30 to 4:30 p.m. A shuttle bus will run to the Advanced Materials Laboratory where the secondary ion mass spectrometer is housed.

In the evening of Saturday, October 15, a banquet will be held at the historic La Posada Hotel in downtown Albuquerque. The evening will begin with a welcoming reception at 6:30 p.m., and dinner will be served at 7:30 p.m.

## PROGRAM

### Conference on Chondrules and the Protoplanetary Disk October 13–15, 1994 Albuquerque, New Mexico

*Wednesday, October 12, 1994*

7:00–9:00 p.m.     *Reception and Registration*  
                            Radisson Inn Ballroom

*Thursday, October 13, 1994*

7:30–8:30 a.m.     *Registration and Continental Breakfast*  
                            Room 117, Department of Earth and Planetary Sciences  
                            (Northrop Hall) University of New Mexico

### GENERAL PROPERTIES OF CHONDRULES AND DISKS

8:30 a.m.   Lecture Hall, Room 122

Chairs:   R. H. Hewins and K. Keil

Wood J. A.\* [Keynote]

*Major Unresolved Issues in the Formation of Chondrules and CAIs*

Hartmann L.\* [Keynote]

*Astronomical Observations of Phenomena in Disks*

Wasson J. T.\* [Keynote]

*Chondrule Origins: Constraints from Chondrule Properties  
and Cosmochemistry*

**BREAK**

Cassen P.\* [Keynote]

*Overview of Nebula Models: Potential Chondrule-forming Environments*

Davis A. M.\*   MacPherson G. J. [Invited]

*Heating and Cooling in the Solar Nebula: Constraints from  
Refractory Inclusions*

Hood L. L.\*   Kring D. [Invited]

*Models for Multiple Heating Mechanisms*

**LUNCH**

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\*Denotes speaker

**FROM CAI TO PLANETS, TIMESCALES**

**1:30 p.m. Lecture Hall, Room 122**

**Chairs: A. P. Boss and R. H. Jones**

MacPherson G. J.\* Davis A. M. [Invited]

*Chronology of Chondrule and CAI Formation—Mg-Al Isotopic Evidence*

Scott E. R. D.\* Love S. G. Hutcheon I. D. [Invited]

*Variations Among Chondrite Groups—Constraints on Nebular Processes*

Hutchison R.\*

*Chondrules and Their Associates in Ordinary Chondrites*

Nyquist L.\* Lindstrom D. Wiesmann H. Bansal B. Shih C.-Y.

Mittlefehldt D. Martinez R. Wentworth S.

*Mn-Cr Isotopic Systematics of Chainpur Chondrules and Bulk Ordinary Chondrites*

Swindle T. D.\* Hohenberg C. M.

*I-Xe Studies of Individual Chondrules: What Can They Tell Us About Chondrule Formation?*

**BREAK**

**CHONDRULE PRECURSORS**

**3:30 p.m. Lecture Hall, Room 122**

**Chairs: A. P. Boss and R. H. Jones**

Brearley A. J.\* [Invited]

*Chondrule-Matrix Relationships in Chondritic Meteorites*

Misawa K.\* Nakamura N.

*The Origin of Refractory Precursor Components of Chondrules*

Thiemens M. H.\*

*Chemical Production of Chondrule Oxygen Isotopic Composition*

Weisberg M. K.\* Prinz M.

*Implications for the Evolution of Chondrules from Agglomeratic Olivine Chondrules*

Connolly H. C. Jr.\* Hewins R. H.

*Constraints Placed on the Nature of Chondrule Precursors*

**POSTER PRESENTATIONS****5:30–6:30 p.m. Room 117**

Ash R. D. Russell S. S.

*Carbon, CAIs, and Chondrules*

Fujita T. Kitamura M.

*Crystallization Trends of Precursor Pyroxene in Ordinary Chondrites—  
Implications for Igneous Origin of Precursor*

Gibbard S. G. Levy E. H.

*On the Possibility of Precipitation-induced Vertical Lightning in the  
Protoplanetary Nebula*

Love S. G.

*Implications of a Phase-Transition Thermostat for Chondrule Melting*

Nehru C. E.\* Weisberg M. K. Prinz M.

*Porphyritic vs. Nonporphyritic Chondrules*

Sasaki S. Nagahara H. Kitagami K. Nakagawa Y.

*Heating During Solar Nebula Formation and Mg Isotopic Fractionation  
in Precursor Grains of CAIs and Chondrules*

Tsuchiyama A.\* Kitamura M.

*Establishment of Redox Conditions During Planetary Collisions as  
an Origin of Chondrites*

Wasson J. T. Rasmussen K. L.

*The Fine Nebula Dust Component: A Key to Chondrule Formation  
by Lightning*

Zinovieva N. G. Mitreikina O. B. Granovsky L. B.

*Textural Variability of Ordinary Chondrite Chondrules: Implications  
of Their Formation*

*Friday, October 14, 1994*

**HEATING, COOLING, AND VOLATILES**

**8:30 a.m. Lecture Hall, Room 122**

**Chairs: J. N. Cuzzi and E. R. D. Scott**

Hewins R. H.\* Connolly H. C. Jr. [Invited]

*Experimental Constraints on Models for Origins of Chondrules:  
Peak Temperatures*

Lofgren G. E.\* [Invited]

*Experimental Constraints on Models for the Origin of Chondrules:  
Cooling Rates*

Weinbruch S.\* Müller W. F.

*Cooling Rates of Chondrules: A New Approach*

Palme H.\* [Invited]

*Formation of Chondrules and CAIs by Nebular Processes*

Newsom H. E.\*

*Siderophile Elements and Metal-Silicate Fractionation in the  
Solar Nebula*

**BREAK**

Nagahara H.\* [Invited]

*Constraints on Chondrule and CAI Origins from Vapor-Liquid-  
Solid Experiments*

Sears D. W. G.\* Shaoxiong H. Benoit P. H. [Invited]

*Open-System Behavior During Chondrule Formation*

Grossman J. N.\* [Invited]

*The Role of Chondrules in Nebular Fractionations of Volatiles and  
Other Elements*

Yu Y.\* Hewins R. H. Connolly H. C. Jr.

*Flash Heating is Required to Minimize Sodium Losses from Chondrules*

Zanda B.\* Yu Y. Bourot-Denise M. Hewins R. H. Connolly H. C. Jr.

*Chondrule Precursors and Cooling Paths: The Sulfur Evidence*

**LUNCH**



**LARGE-SCALE PROCESSES**  
**1:30 p.m. Lecture Hall, Room 122**  
**Chairs: A. E. Rubin and J. A. Wood**

Boss A. P.\* [Invited]

*Large-Scale Processes in the Solar Nebula*

Ruzmaikina T. V.\* Ip W.

*Chondrule Formation in the Radiative Accretional Shock*

Liffman K.\*

*The Jet Model of Chondrule Formation*

Huss G. R.\*

*The Early Sun and the Formation of Chondrules*

Cuzzi J. N.\* Dobrovolskis A. R. Hogan R. C. [Invited]

*Turbulent Diffusion and Concentration of "Chondrules" in the Protoplanetary Nebula*

Metzler K.\* Bischoff A. [Invited]

*Constraints on Chondrule Agglomeration from Fine-grained Chondrule Rims*

**BREAK**

**MULTIPLE HEATING EVENTS**  
**3:30 p.m. Lecture Hall, Room 122**  
**Chairs: A. E. Rubin and J. A. Wood**

Alexander C. M. O'D.\* [Invited]

*Producing Chondrules by Recycling and Volatile Loss*

Jones R. H.\* [Invited]

*Relict Grains in Chondrules: Evidence for Chondrule Recycling*

Rubin A. E.\* Krot A. N. [Invited]

*Chondrule Remelting: Evidence from Coarse-grained Chondrule Rims and Compound Chondrules*

Paque J. M.\* Bunch T. E.

*A Ceramic/Slag Interface as an Analog for Accretion of Hot Refractory Objects and Rim Formation*

*Saturday, October 15, 1994*

**SMALL-SCALE HEATING EVENTS**

**8:30 a.m. Lecture Hall, Room 122**

**Chairs: P. Cassen and J. T. Wasson**

Horanyi M.\* [Invited]

*Chondrule Formation in Lightning Discharges*

Love S. G.\* Keil K. Scott E. R. D.

*Formation of Chondrules by Electrical Discharge Heating*

Krot A. N.\* Rubin A. E.

*Microchondrules in Ordinary Chondrites: Implications for  
Chondrule Formation*

Sanders I. S.\*

*The Circumplanetary Nebular Environment: A Possible Source Region  
for Chondrules*

Kitamura M. Tsuchiyama A.\*

*Collision of Cometlike and Slightly Differentiated Bodies as an Origin  
for Ordinary Chondrites*

**BREAK**

**SUMMARY AND DISCUSSION**

**11:00 a.m. Lecture Hall, Room 122**

R. H. Hewins

*Cosmochemical Constraints on Chondrule Origins*

A. P. Boss

*Astrophysical Constraints on Chondrule Origins*

**ADJOURN**