

COLLISIONAL PROCESSES IN THE SOLAR SYSTEM

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SPRINGER-SCIENCE+BUSINESS MEDIA, B.V.

Collisional Processes In The Solar System

**United States. National Aeronautics
and Space Administration**



Collisional Processes In The Solar System:

Collisional Processes in the Solar System Mikhail Ya. Marov, Hans Rickman, 2012-12-06 The exploration of our Solar System is rapidly growing in importance as a scientific discipline During the last decades great progress has been achieved as the result of space missions to planets and small bodies as asteroids and comets and improved remote sensing methods as well as due to refined techniques of laboratory measurements and a rapid progress in theoretical studies involving the development of various astrophysical and geophysical models These models are based in particular on the approach of comparative planetology becoming a powerful tool in revealing evolutionary processes which have been shaping the planets since their origin Comets and asteroids being identified as remnants of planetary formation serve as a clue to the reconstruction of Solar System history because they encapsulated the primordial material from which the planets were built up At the same time these interplanetary carriers of original matter and messengers from the past being triggered by dynamical processes well outside our neighboring space were responsible for numerous catastrophic events when impacting on the planets and thus causing dramatic changes of their natural conditions In the crossroads of astronomy and geophysics recent years have seen a growing understanding of the importance of collisional processes through out the history of the Solar System and therefore the necessity to get more insight into the problem of interactions of planets and small bodies

Collisional Processes in the Inner Solar System Sandra Victoria Jeffers, 2000 **Organizations and Strategies in Astronomy 6** Andre Heck, 2006-10-14 When I was a child growing up in South America I often went camping in the wild and hence had direct access to the wondrous Southern sky the Southern Cross was all mine at the time Little did I know then that the study of the sky would take such a huge importance in my life and that in the end astronomy and astrophysics would in many ways become my country and my religion I have lived in several different countries and when asked my nationality I am always very tempted to reply astronomer I started as a theorist and my only dream in my youth was to spend nights thinking and calculating with paper and pencil and to have the impression by dawn that I had understood something new So at the time astronomy was seen or dreamt by me as a solitary endeavour with periodic encounters with my wise adviser and professors it is this model that I adopted when doing my PhD work My generation has lived through many revolutions of all kinds Those in astronomy I believe remain particularly remarkable and I am a true product of them Now I elect to live and work in large organizations and to share my endeavours with many people And I relish the series of Andre Heck on Organizations and Strategies in Astronomy which help us recover our memories reconstitute our own story and read with glee about our neighbouring or far away colleagues *Collisional Processes Involving Icy Bodies in the Solar System* Sarah T. Stewart, 2002 *Mechanics of Turbulence of Multicomponent Gases* Mikhail Ya. Marov, Aleksander V. Kolesnichenko, 2002-02-28 Space exploration and advanced astronomy have dramatically expanded our knowledge of outer space and made it possible to study the in-depth mechanisms underlying various natural phenomena caused by complex

interaction of physical chemical and dynamical processes in the universe Huge breakthroughs in astrophysics and the planetary sciences have led to increasingly complicated models of such media as giant molecular clouds giving birth to stars protoplanetary accretion disks associated with the solar system's formation planetary atmospheres and circumplanetary space The creation of these models was promoted by the development of basic approaches in modern mechanics and physics paralleled by the great advancement in the computer sciences As a result numerous multidimensional non stationary problems involving the analysis of evolutionary processes can be investigated using wide range numerical experiments Turbulence belongs to the most widespread and at the same time the most complicated natural phenomena related to the origin and development of organized structures over a wide range of different scale at a definite flow regime of fluids in essentially non linear hydrodynamic systems This is also one of the most complex and intriguing sections of the mechanics of fluids The direct numerical modeling of turbulent flows encounters large mathematical difficulties while the development of a general turbulence theory is hardly possible because of the complexity of interacting coherent structures Three dimensional non steady motions arise in such a system under loss of laminar flow stability defined by the critical value of the Reynolds number

Small Bodies in Planetary Systems Ingrid Mann, Akiko Nakamura, Tadashi Mukai, 2009-03-01 The small bodies in planetary systems are indicative of the material evolution, the dynamical evolution and the presence of planets in a system Recent astronomical research, space research, laboratory research and numerical simulations brought a wealth of new and exciting findings on extra solar planetary systems and on asteroids, comets, meteoroids, dust and trans Neptunian objects in the solar system Progress in astronomical instrumentation led to the discovery and investigation of small bodies in the outer solar system and to observations of cosmic dust in debris disks of extra solar planetary systems Space research allowed for close studies of some of the small solar system bodies from spacecraft This lecture series is intended as an introduction to the latest research results and to the key issues of future research The chapters are mainly based on lectures given during a recent research school and on research activities within the 21st Century COE Program Origin and Evolution of Planetary Systems at Kobe University Japan In Chap 1 Taku Takeuchi discusses the evolution of gas and dust from protoplanetary disks to planetary disks Using a simple model he studies viscous evolution and photoevaporation as possible mechanisms of gas dispersal He further considers how the dust grows into planetesimals Motion of dust particles induced by gas drag is described and then using a simple analytic model the dust growth timescale is discussed **Literature 1986, Part 1** Prof. Dr. Roland Wielen, S. Böhme, U. Esser, H. Hefele, Inge Heinrich, W. Hofmann, D. Krahn, V. R. Matas, Dr. Lutz D. Schmadel, G. Zech, 2013-04-17 *The Impact of Minor Bodies of Our Solar System on Planets and Their Middle and Upper Atmosphere* Petrus Matheus Marie Jenniskens, A. Cellino, Stephan D. Price, 2004 *Reports of Planetary Geology and Geophysics Program, 1989* Henry E. Holt, 1990 **The Exoplanet Handbook** Michael Perryman, 2011-05-26 Exoplanet research is one of the most explosive subjects in astronomy today More than 500 exoplanets are now known and groups world wide are actively involved in a

broad range of observational and theoretical efforts This book ties together these many avenues of investigation from the perspectives of observation technology and theory to give a comprehensive up to date review of the entire field All areas of exoplanet investigation are covered making it a unique and valuable guide for researchers in astronomy and planetary science including those new to the field It treats the many different techniques now available for exoplanet detection and characterisation the broad range of underlying physics the overlap with related topics in solar system and Earth sciences and the concepts underpinning future developments It emphasises the interconnection between the various fields and provides extensive references to more in depth treatments and reviews

Astrodynamics, Space Missions, and Chaos

Edward Belbruno, David Folta, Pini Gurfil, 2004 The subject of astrodynamics is of particular interest at this critical juncture for space projects in the wake of the Columbia disaster This volume based on a conference sponsored by NASA and Princeton University comprises papers on the applications of chaos and dynamical systems including considerations of asteroid pairs near Earth objects and asteroidal dust formation flying optimization guidance and control systems mission design orbit dynamics and propulsion including material on NASA's major initiative Project Prometheus The volume is also of value to mathematicians for its discussion of chaos related issues to astronomers astrodynamacists and planetary geologists for its blueprint for the methodology of future space exploration and to engineers for its discussion of innovations in space propulsion systems It is also a must read for commercial economic and military policymakers

Reports of Planetary

Geology and Geophysics Program -- 1989 United States. National Aeronautics and Space Administration, 1990

Reports of Planetary Geology and Geophysics Program - 1984, 1985 **Asteroids: an Exploration Assessment**, 1978

Near-Earth Objects, Impact Hazards, and the Mars International Program COSPAR. Scientific Assembly, 2001

Publications of the Astronomical Institute of the Czechoslovak Academy of Sciences, 1987 *Asteroids III* William F.

Bottke, Alberto Cellino, Paolo Paolicchi, Richard P. Binzel, 2002-12-01 Two hundred years after the first asteroid was discovered asteroids can no longer be considered mere points of light in the sky Spacecraft missions advanced Earth based observation techniques and state of the art numerical models are continually revealing the detailed shapes structures geological properties and orbital characteristics of these smaller denizens of our solar system This volume brings together the latest information obtained by spacecraft combined with astronomical observations and theoretical modeling to present our best current understanding of asteroids and the clues they reveal for the origin and evolution of the solar system This collective knowledge prepared by a team of more than one hundred international authorities on asteroids includes new insights into asteroid meteorite connections possible relationships with comets and the hazards posed by asteroids colliding with Earth The book's contents include reports on surveys based on remote observation and summaries of physical properties results of in situ exploration studies of dynamical collisional cosmochemical and weathering evolutionary processes and discussions of asteroid families and the relationships between asteroids and other solar system bodies Two

previous Space Science Series volumes have established standards for research into asteroids Asteroids III carries that tradition forward in a book that will stand as the definitive source on its subject for the next decade **Nuclear Tracks J.**
N. Goswami,1982 Proceedings of the Fifteenth I S A S Lunar and Planetary Symposium Hiroichi Hasegawa,Hiroshi
Ōya,Mikio Shimizu,1982 **NASA Conference Publication** ,1992

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