

Curriculum Vitae

David P. Stern

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Research area: Electrodynamics and magnetic field of the Earth's magnetosphere.

Publications: <http://www.phy6.org/stargaze/Spub.htm>

Education: 1959 D.Sc. Israel Inst. of Technology, Haifa,
(thesis on cosmic rays, "Muons in the Atmosphere and Underground").
1956, M.Sc., Hebrew University, Jerusalem.

Previous positions: 1963--2001, NASA Goddard Space Flight Center.
1961-3, NSF/NRC Research Associate, Goddard Space Flight Center.
1959-61, Research Associate, Department of Physics, University of Maryland.

Honors: Special Achievement Awards 1970, 1978, 1981, 1983. Fellow of Amer. Phys. Soc., 2000

Professional society memberships: American Geophysical Union
American Physical Society
Amer. Assoc. of Physics Teachers

Scientific Work

Born in Czechoslovakia, D.P. Stern grew up in Israel, where he received his D. Sc. in physics from the Israel Institute of Technology in Haifa (Technion) in 1960, after completing a study of the angular distribution of cosmic ray muons underground.

In November 1959 he came to Fred Singer's group at the University of Maryland as research associate, working until 1961 on the observation of cosmic rays from balloons

and high-flying aircraft. In June 1961 he joined the Theoretical Division of Goddard Space Flight Center in Greenbelt, Maryland, first as post-doctoral fellow and after 1963 as AST, Fields and Particles. In 1976 he moved to the Laboratory for Extraterrestrial Physics.

Until his retirement in 2001, Stern was associated with GSFC, studying theoretical aspects of Earth's magnetosphere, in particular its large-scale electrodynamics, global description of its magnetic fields and particle motion. Some of his achievements: helping elucidate the origin of the cosmic ray anisotropy (1964), introduction of Euler potentials to describe the magnetosphere (also coining the term; 1967), devising the superposition model of the open magnetosphere (1973), ill-conditioning of magnetic surveys based on field magnitude observations alone ("Backus effect", 1975), drift-free particle motion in the geotail (1975), modeling of the magnetospheric electric field (parallel to work by H. Volland), role of O-type neutral lines in reconnection (1979; that solution however is undone by the need for charge neutrality), parabolic harmonics in magnetopause modeling (1985), deformation mapping of the Earth's field ("stretch transformations", 1987), and modeling of Birkeland currents (1993). He has published a "[Strategy for Magnetospheric Research](#)" and developed the concept of the [Profile](#) multi-spacecraft mission to the Earth's magnetosphere, publishing the plan in *J. Astronaut. Sci.* Together with N.A. Tsyganenko, worked at GSFC on modeling the Earth's magnetosphere.

He has published several comprehensive reviews, incl. on field line motion (1966), magnetic field representation (1976), electric fields (1977), an overview of magnetospheres for *Ann. Rev. Astron. Astrophys.* (1982), "Energetics of the Magnetosphere" (1984) and "Where do magnetic field lines go in the Quiet Magnetosphere?" (1988), "A Brief History of Magnetospheric Physics Before the Spaceflight Era" (1989), "The Art of Mapping the Magnetosphere" (1994), "[A Brief History of Magnetospheric Physics during the Space Age](#)" (1996), "[A Millennium of Geomagnetism](#)" (2002) as well as "A Historical Introduction to the Ring Current" (2005).

Activities in the Science Community

In 1978 Stern compiled NASA's 5 year plan for solar-terrestrial physics. He twice edited quadrennial US reports to IUGG on magnetospheric research (*Rev. Geophys.*, 1979, 1983). In 1987 he organized a IAGA symposium "Physics of the Quiet Magnetosphere" and later edited the publication of its proceedings in *Rev. Geophysics*. At the 1989 IAGA meeting in Exeter he convened a symposium "Magnetospheric Models and their Assessment" and organized a 1-day tutorial workshop, and he organized at GSFC workshops (3.5 days each, up to 40 participants) on the physics and modeling of the global magnetosphere in 1990, 1991, 1992 and in 1994

His side interests include the history of geophysics, where he founded in 1982 the AGU's Committee on the History of Geophysics, heading it until 1988, and served as *Eos* editor for history, 1999-2001. He has published an interview with James Dungey (1986) and a comprehensive history of his field, as well as one on the history of geomagnetism, in articles in *Rev. Geophys* (listed above). He has published in *Eos* "Remembering Robert Goddard's Vision 100 years later" (*Eos*, Sept. 21, 1999, p. 441), on the 100th anniversary of the day (19 October 1899) when Goddard (at age 17) decided to dedicate himself to

the vision of spaceflight, and numerous other contributions.

He enjoys creative writing and his concern with education led to "Math Squared" (Columbia Teachers College, 1980), a book on math for children, as well as to several articles in "The Physics Teacher," "Amer J. of Physics," "Science Teacher" etc.

He has produced a on the world-wide web three book-sized scientific overviews. The first one (non-mathematical) covers magnetospheric physics, is titled "**The Exploration of the Earth's Magnetosphere**" and its home page is at <http://www.phy6.org/Education/Intro.html>.

A more recent web site, titled "**From Stargazers to Starships**" at <http://www.phy6.org/stargaze/Sintro.htm> covers astronomy, Newtonian mechanics, the Sun and spaceflight, and also includes a short math course, 46 lesson plans, a timeline, glossary, collected questions and answers, instructions to teachers, and translation to Spanish (by Mr. Jesus Mendez) French (by Dr. Guy Batteur) and Italian (by Mr. Giuliano Pinto).

Still more recently he produced a popular historical overview of geomagnetism (marking the 400th anniversary of William Gilbert's "De Magnete") "**The Great Magnet, the Earth**" with home page at <http://www.phy6.org/earthmag/demagint.htm>, with Spanish, French and German translations.

A more personal collection of web pages "**Welcome to my World**" (<http://www.phy6.org/outreach/outreach.htm>) includes book reviews, "Jewish Heritage", a revised Passover Haggadah, poems and various science-related writing