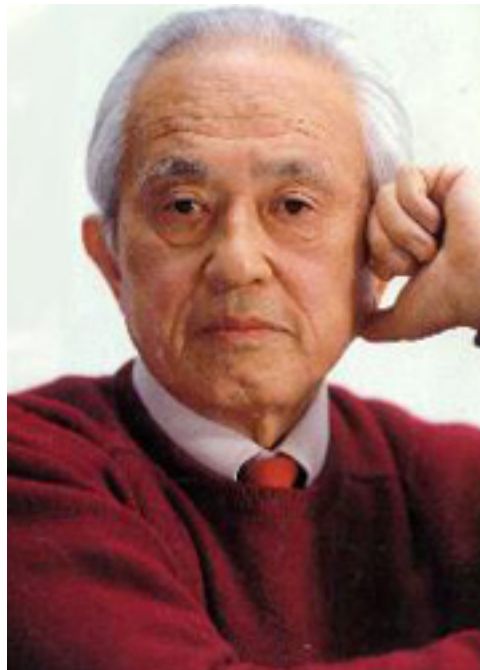




Prof. Minoru Oda

Professor of Astrophysics, Tokyo University of Information Sciences, Japan



Most important awards, prizes and academies

Awards: Japan Academy Award-Emperor's Award (1975); Ziorkovsky Medal-USSR (1987); Von Karman Awards-IAA (1987); 6th Marcel Grossmann Award (1991); The Order of Cultural Merit-Japan (1993); COSPAR Award (1996). *Memberships:* The Japan Academy (1988); Academia Europaea (1994); Indian Academy of Sciences (1994).

Summary of scientific research

The main contributions of Prof. Minoru Oda are in the study of X-ray astronomy since 1963 when he joined Prof. Bruno Rossi of MIT who is one of the founders of the X-ray astronomy, after years of his contributions in solar radio astronomy and cosmic ray physics. Some details of his activities are briefed in the following.

1-1): The location of the first-discovered and the brightest X-ray sources Sco X-1 was precisely determined by means of the modulation collimator invented by himself on board sounding rockets in collaboration with his colleagues at MIT in early 1960. The references include: Oda, M. *et al.*, *Nature*, 205, 55 (1965); Clark, G. *et al.*, *Nature*, 207, 58 (1965); Gursky, H. *et al.*, *Astrophysical J.*, 146, 3 (1966).

1-2): The X-ray source Sco-X-1 was identified with an optical object by an international collaboration of X-ray and optical group in US and Japan; i.e., Oda and his colleagues at MIT and at American Science and Engineering on the one hand and Palomar Observatory and Tokyo Astronomical Observatory (TAO) on the other. See, e.g., Sandage, A. *et al.*, *Ap. J.*, 146 (1966); Oda, M., *Space Science Revs*, 8, 507 (1968).

1-3): The location of an X-ray source in Cygnus Constellation was precisely determined by using the modulation collimators on board balloons, sounding rockets and satellites. The collaboration on this object, Cyg X-1, led optical and radio astronomers to conclude that it is a very likely candidate of the black hole. See, e.g., Miyamoto, S. *et al.*, *Ap. J.L.*, 168, 211 (1971); Oda, M., *Space Science Revs*, 20, 757 (1977).

1-4): The X-ray study of the structure of Crab Nebula was performed by means of modulation collimators on board a sounding rocket under the same collaborations 1-1). See Oda, M. *et al.*, *Ap. J.*, 148, L5 (1967). Also a series of balloon experiments with modulation collimators were carried out under collaborations of ISAS and UCSD. See Pelling, M. *et al.*, *Ap. J.*, 319, 419 (1987). The evolution of X-ray astronomy since 1960s is reviewed in Oda, M., «Genome» Records in the History of X-ray astronomy; *New Horizon of X-ray Astronomy* (Universal Academy Press, Tokyo) ed. Makiko, Oshashi 1994, P3.

2-1): The Solar astronomy satellites, Hinotori and Yohkoh, were launched by ISAS and produced X-ray images and X-ray movies of the Sun under the collaboration of ISAS and TAO with US laboratories, Lockheed, Naval Research Laboratory and others, as well as with those in UK, RAL and MSSL. Oda as the Director general of ISAS then was instrumental in coordination of this international undertaking. See Oda, M., *Physics of Solar and Stellar Coronae*, ed. Linsky and Serio, pp. 59-68, Kluwer Academic Publishers (1993).

2-2): Oda promoted an international collaboration between Japan and India on the study of multi-band observation of Sco X-1. Namely ISAS and TAO worked with Tata Institute of fundamental Research on the simultaneous observations of the object in X-rays, visible, infrared and radio on a number of occasions. See Matsuoka, M., *Nature*, 236, 53 (1972).

2-3): Oda promoted an international collaboration between ISAS/TAO in Japan and MIT/ASE/Palomar Observatory in US together with some of the ground-based observatories in both the countries on the simultaneous observations on X-ray bursts. See Pedersen, H. *et al.*, *Ap. J.*, 263, 325 (1982); Lawrence, A. *et al.*, *Ap. J.*, 267, 301 (1982).

2-4): Oda played an important role in coordinating the study of Solar Terrestrial Physics by means of the satellite GEOTAIL launched by ISAS and NASA in 1996. This experiment explored far in the wake of the solar wind behind the moon.