

S.M. Chitre – a life well lived



The ever-smiling face of Shashikumar Madhusudan Chitre (1936 – 2021) — Kumar Chitre to friends — will never again be seen in the corridors of academia. The doyen of astrophysicists in the country has finally gone back to the stars which he studied all his life, leaving behind a vacuum which will be hard for anyone to fill as confidently and elegantly as he did during his long and active years on this planet. Out of these, 34 years were spent in TIFR, where his presence will be long remembered and appreciated.

Chitre was a true product of Bombay — or Mumbai — where he was born at Bandra in 1936. Educated at upmarket schools in the locality, he obtained a B.A. in Mathematics from the Elphinstone College in Mumbai (1956) where, at the same time, he imbibed a love for arts and literature. He then won a prestigious scholarship to Cambridge, where he joined St. Peter's College (Peterhouse) and completed the Mathematical Tripos in 1959. At Peterhouse, he heard lectures by luminaries like Dirac, Mott and Atiyah, but it was Fred Hoyle who liked his Tripos final essay '*Why are sunspots dark?*' so much that he suggested that it be developed into a Ph.D. thesis. Chitre's love affair with the Sun lasted the rest of his life. For his Ph.D., he moved to Churchill College, where the next office was occupied by none other than Stephen Hawking, who was then a sportsman and (as Chitre later related) taught him to play croquet. Completing his Ph.D. with Hoyle on *The Structure of Sunspots* (1963), Chitre joined the University of Leeds as a Lecturer, but after three years he went off to work with W.A. Fowler (later a Nobel Prize winner) as a postdoc at Caltech. It was here that he interacted closely with John Bahcall and Kip Thorne, the 2017 Nobel laureate. More significantly, he met S.K. Bhattacharjee, a nuclear physicist from TIFR, who persuaded him to apply to TIFR for a job. It was 1966, the tumultuous year when Homi Bhabha died, but the new Director, M.G.K. Menon, promptly offered the young astrophysicist a position. And so, in 1967, Chitre returned to Bombay, where he was to spend the rest of his life.

Throughout his career, Chitre focused especially on the magnetohydrodynamics of the Sun, in particular the theory of the solar dynamo and its manifestation through the solar cycle. In collaboration with his doctoral student H. M. Antia, and later Sarbani Basu, Chitre pioneered researches on helioseismology in India. Their major contributions in this area were in the mapping of the differential rotation of the solar interior and measuring heavy element abundances in the solar interior. Chitre's scientific interests extended far beyond the Sun, and he delved deeply into research in gravitational lensing, and the physics of compact collapsed objects. With doctoral students D. Narasimha and S. Kandaswamy, Chitre initiated the study of gravitational lensing in India and they quickly made several important contributions regarding a variety of strongly-lensed objects, and studied the use of gravitational lensing as cosmic diagnostics for extended structures in the Universe. He also co-authored several important papers on the physics of interiors of neutron stars and emissions from their accretion disks. Chitre collaborated with a wide spectrum of researchers over the years including many of his colleagues at TIFR and his long-term overseas collaborators included Douglas Gough, Michael Thompson, Pierre Lesaffre, Francis Bernardeau, Vittorio Canuto and Astronomer Royal Martin Rees.

Retiring from TIFR as a senior professor in 2001, Chitre remained active for the next two decades. He was a driving force in setting up the Centre for Excellence in Basic Sciences (CBS), a joint venture of the DAE and the University of Mumbai, where he remained Academic Chairperson till his final days. An educationist to the core, he was always an excellent teacher and highly interested in scientific outreach, which he organized and participated in with great enthusiasm.

Among his many honours, Chitre was a Fellow of the Royal Astronomical Society and the Third World Academy of Sciences. He was a Fellow of all the three Indian Science Academies and President of the Astronomical Society of India. In 2012, he was awarded the Padma Bhushan.

Chitre is survived by his wife Suvarna, and their two sons Yatin and Yougandh, who live in the United States.