

Dedicated to the memory of
Armin J. Deutsch



ARMIN J. DEUTSCH
1918–1969

DEDICATION

It is sadly appropriate that Armin Deutsch's last public remarks should be those that brought the Columbus Symposium on Stellar Rotation to a close. Sad, because, at the time of his premature death one month later, he was in the midst of fruitful scientific pursuits. Appropriate, because, in his role as final speaker – a role he filled so admirably on many occasions – his colleagues from all parts of the world had one last opportunity to express their esteem for him and for his contributions to astronomy. Though his scientific interests were catholic, the problems of stellar rotation, especially those related to the peculiar A-type stars, constituted a persistent theme to which Armin Deutsch returned throughout his career.

In 1945 Deutsch became intrigued by the enigmatic spectrum variations of certain peculiar A-type stars. In his thesis, *A Study of the Spectrum Variables of Type A*, he described a number of new variables that he had discovered with the 40-inch refractor at Yerkes Observatory, determined periods for several of them, and compiled a first catalogue of such objects. Simultaneous with this work Horace Babcock at Mt. Wilson had begun to discover variable magnetic fields in these same stars. Within a few years Babcock had found magnetic periodicities for several stars; the periods of the magnetic variations and spectrum variations were identical. It was Babcock who first considered that the magnetic variations might be caused by the rotation of an inclined magnetic dipole, and shortly thereafter Stibbs worked out the observational consequences of this model. However, it was Armin Deutsch who saw in this idea an explanation for *all* of the observed characteristics of a magnetic-spectrum variable. Deutsch's convictions were bolstered by his discovery of an inverse relation between the periods of Ap stars and the widths of their absorption lines – a relation that could be understood quantitatively if the periods were rotational periods. In a report to Commissions 27 and 29 of the Eighth General Assembly of the IAU in September 1952, Deutsch concluded that “in the spectrum variables we observe the rotation of A stars that exhibit intensely magnetic areas within which the peculiar line strengths are produced... On this model it is possible to give at least a qualitative explanation of the radial velocities..., of the doubling of certain lines..., of the non-zero mean magnetic field..., and of the ‘cross-over’ effect observed by Babcock...”.

The spectroscopic patches advocated by Deutsch provoked debate that persisted for nearly two decades. Were the patches due to surface nuclear reactions, to paramagnetic migration, to selective radiation pressure, or to what? Do they really exist? Putting aside questions of the physical processes that were involved, Deutsch went on to devise a method for mapping the magnetic fields and abundances of the elements on his rotating stars by use of the observed variations in equivalent width, radial velocity, and effective magnetic field. He presented a preliminary report on his method

as applied to HD 125248 in 1956. The method has since been employed in analyses of $\alpha^2\text{CVn}$ by Diane Pyper and of HD 173650 by John Rice; a detailed description of the method appeared posthumously in a recent issue of *The Astrophysical Journal*. Although Deutsch felt that the evidence in favor of the rotator model for Ap stars was overwhelming, he was the first to admit that it was circumstantial; to this day a crucial test of the model has not been devised. That so much circumstantial evidence now exists is due in large measure to the adrenalin, pro and con, that flowed in others because of Deutsch's ideas, and this is perhaps the best measure of his stature as an astronomer.

At the time of his death Armin Deutsch was busily engaged in other studies of stellar rotation: the bimodal distribution of rotational velocities for upper main sequence stars, discussed first in 1965 and most recently in this volume; the large rotational velocities of the blue stragglers in old open clusters and their implications for rapid rotation of the interiors of solar-type stars; and, finally, the variable Ca II K_2 and K_3 components of M-type giants that he had come to believe were due to transient chromospheric activity modulated by stellar rotation. Armin Deutsch has left these problems for others to carry to completion, and he has left us. We will miss him.

GEORGE W. PRESTON