

BOOK REVIEW

Geoelectromagnetic Waves, by A. V. Guglielmi and O. A. Pokhotelov.
Institute of Physics, Bristol and Philadelphia, 1996, 382+xx pages.
Hardcover, ISBN 0 7503 0052 3. £100, \$200.

The range of this book is extremely wide. It includes treatments of waves arising in the magnetosphere and the interplanetary medium on the one hand, and ocean waves, lightning discharges and waves associated with earthquakes on the other. The authors have coined the term 'geoelectromagnetic waves' so as to include all phenomena of natural origin that perturb the electromagnetic field of the Earth.

The treatment is also extremely broad. Subjects such as magnetohydrodynamics, plasma kinetic theory and wave propagation are treated from scratch. Some of this material will be well known to plasma physicists. However, it is a pleasure to read a clear and informed exposition of basic material.

Some of the more advanced topics are as follows: the earth's crust; the ocean; the atmosphere and ionosphere; the magnetosphere; modulation of waves; instabilities; nonlinearities (including solitons and methods of detecting them); fluctuations and critical phenomena; hydromagnetic diagnostics and geoelectric prospecting; geoelectromagnetic waves and man.

Simple theories are matched to experimental evidence throughout. These comparisons are impressive. Arguments both for and against treating these matches seriously are given at some length. The authors are obviously very active in this field.

Numerous exercises, invariably followed by solutions, will help the research student.

Criticisms are minute as compared with the obvious strengths of this unique book. Sometimes the treatment of theory is restricted; for example, the only soliton equation quoted is the one-dimensional nonlinear Schrödinger equation. Many other soliton equations are known to model geoelectromagnetic phenomena (to compensate, an extensive treatment of Alfvén vortices follows). References almost peter out around 1990, with the exception of the authors' own work. However, coverage of work up to the beginning of the decade is impressive, with 17 pages of references. The appendix on experimental techniques is invaluable.

All in all, this book is a very worthwhile addition to any library. The price makes it difficult to recommend for purchase to research students in the field, though they would be well advised to consult it.

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