near the lower hybrid frequency with the magnetic-field lines indicates that the cone direction is determined from local plasma and magnetic field parameters. Furthermore, the fact that the cone field near the lower hybrid frequency travels along the magnetic-field line can be used to determine the magnetic-field line by an observation of the cone field.

III. Conclusions

The cone field near the lower hybrid frequency is confirmed experimentally to travel along the magnetic-field line in converging and diverging magnetic fields. The fact results in that the direction of the cone field is determined from local plasma and magnetic parameters. Furthermore, the result indicates that the magnetic-field line can be determined from the spatial observation of the cone field near the lower hybrid frequency.

Acknowledgment

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Correction to "Optical Diagnostics Using a Barium Ion Beam for Spatial Resolution of Plasma Parameters"

J. A. COBBLE AND J. C. GLOWIENKA

In the above paper,[1] a line of text was inadvertently omitted. The following line should have appeared between (6) and (7):

"The term n_b may be expressed in terms of beam potential, ϕ, and current, I:."

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[1] J. A. Cobble and J. C. Glowienka, *IEEE Trans. Plasma Sci.*, vol. PS-7, pp. 147-151, Sept. 1979.

Book Reviews

Solitons in Actions (Proceedings of a Workshop held at Redstone Arsenal, October 26-27, 1977)—K. Lonngren and A. Scott, Eds. *Reviewed by L. A. Ostrovsky, Applied Physics Institute, Academy of Sciences of the U.S.S.R., Gorky, U.S.S.R.*

This book brightly demonstrated that in modern nonlinear wave theory there comes a "time to collect stones," when one should somehow look into the flow of new data and start summing them up. This book is devoted to the nonlinear solitary wave discovered by John Scott Russell in 1834 and found its new life in the 1960's under the name of "soliton." It is unlikely that in wave theory (and perhaps in theoretical physics at all) many subjects are really capable to compete with soliton in the "universal elementarity" which makes it interesting both for "pure" mathematicians and most "practical" physicists. Mathematicians will readily see a significant relationship between the soliton concept and new methods of solving nonlinear equations with partial derivatives; physicists—a remarkable analogy of solitons with particles; engineers—a possible role of solitons in superconducting tunnel diodes or the use of solitons in pulse radio systems, etc. We recall that having discovered solitons in a channel Scott Russell himself pursued it on horseback!

In some way or other following the estimates of the editors of this book the number of papers with the term "soliton" in the title has reached the value 10^3 a year and continues to grow exponentially.

The fact that *Solitons in Action* is a collection of the workshop proceedings makes the reader alert at first: such editions often represent only a collection of papers on different specific questions reported at a conference, meeting, or symposium. However, this book is quite different since all its authors do their best to introduce the readers into the scope of main ideas and they succeed in doing this in most cases. *Solitons in Action* slightly resembles a collective novel where there is a single intrigue, but each of the authors may proceed the narration at a definite stage only. (As far as I know such attempts have been repeatedly made in fiction). In any case this book on solitons turns out to be interesting and deals with many aspects of this problem. The representative "team" of the authors of its 11 chapters involves both mathematicians and physicists. Also seen is the fruitful work of the editors—K. Lonngren and A. Scott.

The first chaper of the book is devoted to the mathematical theory of solitons. The book begins with a paper by Miura where a short historical survey of a soliton concept and of related new methods of solving the Korteveg-de Vries equation (KdV) has been given. This equation having played a prominent part in the newest "solitonics" remains a noticeable personnage also in the next two chapters written by mathematicians. Moses reviews the modern aspects of the inverse scattering method being, in its time, a new word in nonlinear mathematical physics. Hermann discusses in detail one of the new approaches in the soliton theory associated with using the differential geometry ideas including Lie algebra.

In the next chapters, the center of attraction is transferred to physical problems relative to solitons. This concerns even the 9th chapter with the mathematical title "Perturbation Theory for Solitons" written by McLaughlin and Scott where the general mathematical scheme is immediately applied to studies of fluxons, i.e., soliton waves in a distributed Josephson junction, fundamental properties of which are specified by Paramentier in the previous chapter.

Highly urgent is the question of collective soliton behavior

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considered by Bishop (Chapter 4) who discusses the possibility of describing excited physical systems containing solitons using the terms of statistical mechanics and, to some extent, by Batteh and Powell (Chapter 10) who have performed the numerical calculations of oscillations of originally thermalized one-dimensional nonlinear lattice. In the final chapter, Deem and Zabusky direct their attention to the problems of hydrodynamics and consider the localized vortex motions ("V-states") related to solitons.

Chapters 5–7 should be emphasized particularly since they deal with the experiments with solitons of various physical nature: "envelope solitons" in deep water (Yuen and Lake), electromagnetic solitons in nonlinear transmission lines (Lonngren), ion-sound and Langmuir solitons in plasma (Ikezi). In these chapters, we really see "solitons in action."

Thus the book covers nearly all aspects of modern "solitonics" (at least the American one). Another advantage is that the papers by the Soviet authors are cited comparatively more often than in other similar editions.

The unity and succession of the book are symbolized by the portrait of John Scott Russell in its beginning and brief information about his biography at the end. The book is dedicated to Scott Russell—"teacher, scientist, engineer and enlightened servant of mankind."

It should be certainly admitted that *Solitons in Action* is a collection rather than a monograph and includes only good sketches but not a consistent discussion of the soliton problem. However, even in such a form it will be really useful and interesting to a large audience of students and scientists. To all appearances solitons will long remain "in action."