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Preface for Discussion on Violent surface motion

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Preface

The primary motivation of this Discussion Meeting came from the proliferation of recent investigations, mostly in fluid mechanics, into the large velocities and pressures that are generated when two nearly parallel continua come into contact. As is apparent from the following articles, these investigations have embraced experimental, analytical and numerical techniques.

During the planning stage the organizers were strongly influenced by developments in the 60-year-old theory of ship slamming, which has only been put on a sound mathematical basis within the past decade or so. However, it soon became apparent that the analytical and numerical techniques that have been so helpful with slamming can also be applied to models describing bubble collapse, air entrainment, bow waves and perhaps even the famous walking-on-water Basilisk lizard. On the other hand, the notorious phenomenon of sonoluminescence still presents a formidable modelling challenge, as does the general question of how to handle the sprays that often form in violent liquid impact. They both offer examples of the almost inevitable irreversibility of so many violent surface motions and it is this that is perhaps the greatest challenge that confronts modellers armed only with the usual laws of mechanics and thermodynamics.

The combination of the startling phenomena that can occur during the early stages of an impact and the obvious opportunities for mathematical simplification that exist by virtue of the short time and length scales makes violent surface motion a subject which will continue to appeal to scientists from many disciplines. We hope that this volume will help them in their efforts.

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