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Spatial focusing and breaking of surface waves[1] GERARDO RUIZ-CHAVARRIA, Facultad de Ciencias, Universidad Nacional Autonoma de Mexico, PATRICE LE GAL, MICHAEL LE BARS, IRPHE -UMR 7342 — In this work, we present experimental results about the evolution of a monochromatic wave generated with a parabolic wavemaker. Experiments were carried out in the deep water limit, with frequencies ranging between 3 and 10 Hz. Measurement of surface deformation during the wave breaking was made with a laser sheet that illuminates the interface on the symmetry axis. On the other hand for small amplitude deformation we use the Schlieren method which allows a reconstruction of the fluid surface in a two dimensional domain. The spatial focusing produces a growth of the wave amplitude and the maximal value (if no breaking occurs) is attained after the wave crosses the caustic. Otherwise, wave breaking appears initially at the axis of symmetry, before the origin of the cusp. Some energy is dissipated along the wave propagation and focusing. The wave breaking is followed by a decrease in the amplitude, but in some cases the focusing stops this process. Then the amplitude grows again and another wave breaking can be observed. Our results are compared with the prediction of linear wave theory and with numerical simulation of surface non linear waves. Finally we present a discussion of the evolution of the wave before and after the breaking.

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