Law of spreading of the crest of a breaking wave PATRICE LE GAL,
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Marseille Université, YVES POMEAU, Los Alamos National Laboratory — In a
wide range of conditions ocean waves break. This can be seen as the manifestation
of a singularity in the dynamics of the fluid surface, moving under the effect of the
fluid motion of the underlying fluid. We show that, for shallow water waves at the
onset of breaking, the wave crest expands in the span-wise direction as the square
root of time. This is first derived from a theoretical analysis and then compared
with experimental findings. The agreement is excellent. We then explore another
configuration where the waves are generated by a parabolic wave maker. The fo-
cusing of the initially parabolic fronts induces interferences and also breaking of the
waves if their amplitude is large enough. In this case a widening of the breaking
proportional to the power 3/2 of time is expected as it follows the Huygens cusp
shape.

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