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Influence of a constant vorticity on the Bragg resonance phenomenon

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As part of wave propagation in presence of an inhomogeneous current, the vorticity's effects on scattering characteristic phenomena, in particular on the Bragg resonance, will be studied to improve the understanding and the modeling of coastal dynamics. For this purpose, we consider a linearly and only vertically sheared current, and a slowly varying topography.

Respecting the wave dynamics modelling, a linear propagation model - the mild-slope equation - was settled up (Charland, 2014), describing the propagation of water waves in the presence of slowly varying bathymetries and currents. This model was recently improved to take steeper bathymetric variations into account (Belibassakis et al, 2016), based on the coupled-mode approach (Belibassakis Athanassoulis, 1999).

This new CMS equation is solved numerically. In the same time, an experimental campaign is carried out in a water flume (Simon et al, 2016), in order to control the current shearing. The comparison between numerical and experimental results emphasizes the influence of vorticity on the Bragg resonance.