## Abstract Submitted for the DFD15 Meeting of The American Physical Society

Geometric focusing of internal waves: Experimental study<sup>1</sup> NATALIA SHMAKOVA, LEGI (CNRS & Université de grenoble), EVGENY ERMANYUK<sup>2</sup>, Laboratoire de Physique ENS de Lyon (CNRS & Université de Lyon), BRUNO VOISIN, JAN-BERT FLÓR, LEGI (CNRS & Université de grenoble) — Mixing of the abyssal ocean plays a decisive role in large-scale ocean circulation and is believed to be caused by the nonlinear breaking of internal tides. Previous studies of two- and three-dimensional cases considered the generation of diverging waves by simple oscillating bodies such as a cylinder (e.g. Mowbray and Rarity 1967) or a sphere (e.g. King at al. 2009, Ermanyuk et al. 2011). We here consider converging waves as generated by a horizontally oscillating torus. The energy focuses and therefore the waves are more susceptible to overturning and breaking. LIF and PIV techniques are used to measure respectively the isopycnal displacement and the velocity. We have considered linear and nonlinear wave generation as a function of the Keulegan–Carpenter number, here adapted to the focusing waves. For small oscillation amplitude strong velocity amplification is observed in the focal zone, consistent with linear theory. Increasing the oscillation amplitude causes nonlinear effects and in particular the generation of higher harmonics and overturning in the focal zone. In addition, the focal zone acts as a wave source. Increase of the Stokes and Reynolds numbers leads to wave turbulence in the focal zone.

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