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**Liliana Borcea\*** (borcea@umich.edu), **Josselin Garnier**, **Alexander V Mamonov** and **Joern Zimmerling**. *Reduced order model approach for imaging with waves.*

We introduce a novel, computationally inexpensive approach for imaging with an active array of sensors, which probe an unknown medium with a pulse and measure the resulting waves. The imaging function uses a data driven estimate of the “internal wave” originating from the vicinity of the imaging point and propagating to the sensors through the unknown medium. We explain how this estimate can be obtained using a reduced order model (ROM) for the wave propagation. We analyze the imaging function, connect it to the time reversal process and describe how its resolution depends on the aperture of the array, the bandwidth of the probing pulse and the medium through which the waves propagate. (Received August 23, 2021)