Blocking superradiance with sub-luminal dispersion

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Superradiance involves the extraction of energy and angular momentum from a rotating system by amplification of incident radiation. This effect has been extensively studied for shallow water waves on a draining vortex, which is the analogue of a rotating black hole spacetime. However, experiments have shown that superradiance can also occur for deep water waves. In this short talk, I will discuss some aspects of deep water superradiance. In particular, the sub-luminal dispersion relation means that some superradiant modes are blocked from escaping the vortex and are instead reflected back in. This implies that, in certain parameter regimes, dispersion can prevent superradiant modes from extracting energy and angular momentum from the system.


\begin{figure}[h]
\centering
\includegraphics[width=0.5\textwidth]{figure1.png}
\caption{Blocking of superradiant deep water waves around a draining vortex.}
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