The discovery of entanglement islands represented an important step forward in the theoretical understanding of black hole evaporation. Apart from the low-dimensional toy models, explicit examples of such entanglement surfaces in higher dimensions have been constructed in so-called double holographic models, consisting of End-of-the-World branes embedded in a higher-dimensional anti-de Sitter space. This construction helped identify a consistency requirement for the existence of entanglement islands, namely the modification of Gauss' law, allowing a region of space to be undetectable at infinity. This happens naturally in higher dimensions, thanks to the presence of a massive graviton mode, arising from the coupling of the EOW brane to the boundary of anti-de Sitter, but was not yet understood in lower dimensions, where island surfaces are known to exist. In order to reconcile both descriptions, the author has provided a study of the mechanism in 2 dimensions which allows the graviton to acquire an effective mass thanks to a Stueckelberg-like mechanism. The effect is the same as in higher dimensions: the modification of Gauss' law.

The cause of this effect is once again the coupling of the black hole spacetime to a non-gravitating bath at asymptotic infinity. This leads to an effective breaking of diffeomorphism invariance, mediated by a vector field that gives rise to the 2D graviton mass.

This work has addressed a previous puzzle in the consistency of entanglement islands and has filled a gap in our understanding, extending what was previously understood in higher dimensions to the 2D JT gravity setup. This is an excellent result which deserves rapid publication.