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## Towards a Bohm velocity measurement in Matter-Wave Interferometry experiments

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At UCL, our group had the great privilege of working closely with Basil Hiley in the pursuit of experiments exploring the foundations of quantum theory. Among the many projects we undertook, one held a particularly special place for all of us: the experimental observation of the Bohm velocity. This was a long-standing dream of Basil's, to see the ideas he and David Bohm developed put to the test in the laboratory.

In this talk, I will briefly discuss some of the theoretical and experimental approaches we developed together over the years. One such theoretical approach involves encoding phase information, specifically the Bohm velocity, into the wavefunction using Stimulated Raman Adiabatic Passage (STIRAP), and accessing it via postselected measurements in matter-wave experiments. This enables the interference patterns at the detector to reveal information about the Bohm velocity itself.

I will also briefly review other experimental work pursued by our group that is not directly related to this topic, though many aspects overlap with the Bohm velocity project. Together, these efforts represent a significant part of our research with Basil, and our ongoing attempt to bring foundational quantum ideas into the laboratory.

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