

# Massive Matter-Wave interferometers on the Atom Chip with Nano-Diamonds: a Roadmap

R FOLMAN<sup>1</sup>

<sup>1</sup>*Physics Department, Ben Gurion University of the Negev, Beer-Sheva, Israel*  
Contact Email: folman@bgu.ac.il

Matter-wave interferometry provides an excellent tool for fundamental studies as well as technological applications. Looking to the future, a spatial superposition of massive objects has long been sought after due to the potential for new insight into the foundations of quantum mechanics (QM), the interface of QM and gravity, and as a tool for testing exotic theories. In our group, several interferometry experiments have been conducted with a BEC on an atom chip. I will briefly present realized interferometric schemes based on Stern-Gerlach interferometry (SGI), and mainly focus on plans to use this unique SGI to put a nano diamond in a state of spatial superposition.