



## **Atomic diffraction through a material grating**

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### **Abstract**

What a better textbook experiment in quantum mechanics than Young's slits with matter wave? I will present such an experiment with a cold metastable argon beam crossing homemade material nano gratings. The novelty of our experiment is based on an appropriate ratio between slits depth and atomic velocity to enhance the quantum matter wave properties. First, the diffraction picture is strongly enlarged due to attractive atom surface Casimir-Polder interaction. And second, the theoretical model must use Schrödinger equation rather than semi classical approach. The good control of both experiment and theoretical model leads to one of the most rigorous Casimir-Polder potential measurement opening the path to different research fields like e.g. collective effect mediated by surface, dynamical effect, heat transfer and fifth force constraint.