Tailor-Made Phthalocyanine with Photocleavable Tags for Interferometry Experiments

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Since the dissertation of Louis de Broglie in 1924, where he proposed the wave-matter duality of small particles, such as electrons or neutrons, the study of this phenomenon gained great interest by the scientific community.[1] However, it was never explored in heavier particles and thus, the frontiers between quantum and classical physics could not be established. In the past years, the interference of heavier particles such as fullerenes and phthalocyanines-based compounds has been described[2], pushing the mass limitation to 10`000 amu. However, the studies become more challenging when heavier particles are tested and new approaches are required.

To this aim, the attachment of a photocleavable tag to large objects, such as nanoparticles or biomolecules, is proposed, whose release during the experiment is expected to improve the signal intensity at the detector level. This innovative approach should be tested and optimized first for smaller particles with new optical grids in the interferometry device.[3]

Here we present our new strategy to introduce nitro-aryl protected groups to a phthalocyanine based molecule, to improve the interferometry measurements for the study of massive molecules and to confirm that the photocleavable tag can be split by some new optical grids in the gas phase.

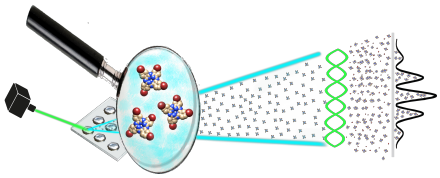

Figure 1: Concept picture of interferometer experiment with nitro-aryl PPG tag (red circles) attached to a phthalocyanine based molecule and the final compound.

[1] Young, T. A course of lectures on natural philosophy and the mechanical arts; Johnson, **1807**.
[2] Broglie, L. D. Nature, **1923**, 112, 540.
[3] Sezer U., Geyer P., Kriegleder M., Debiossac M., Shayeghi A., Arndt M., Mayor M., *M. Beilstein J. Nanotechnol.*, **2017**, 8 (1), 325-333.