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Diffraction in time: An exactly solvable model ARSENI GOUSSEV, Northumbria University — In optics, diffraction is typically portrayed as deflection of light incident upon an obstacle with sharp boundaries, that can not be accounted for by reflection or refraction. Interestingly, quantum mechanics allows for an additional, intrinsically time-dependent manifestation of the phenomenon: Owing to the dispersive nature of quantum matter waves, sudden changes in boundary conditions may cause the particle wave function to develop interference fringes akin to those in stationary (optical) diffraction problems. This phenomenon, pioneered in 1952 by Moshinsky [*Phys. Rev.* **88**, 625 (1952)] and presently referred to as "diffraction in time," is at the heart of a vibrant area of experimental and theoretical research concerned with quantum transients. In my talk, I will introduce a new versatile exactly-solvable model of diffraction in time. The model describes dynamics of a quantum particle in the presence of an absorbing time-dependent barrier, and enables a quantitative description of diffraction and interference patterns in a large variety of setups.

[1] A. Goussev, *Phys. Rev. A* **87**, 053621 (2013).
[2] A. Goussev, *Phys. Rev. A* **85**, 013626 (2012).

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