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Measurement of the velocity of a quantum object: a role of phase and group velocities MIKAILA LAPINSKI, YURI ROSTOVTSEV, Department of Physics, University of North Texas — We consider a free motion of a quantum particle. Introducing an explicit measurement procedure for velocity, we demonstrate that the measured velocity is related to the group and phase velocities of the corresponding matter waves. We have obtained the dispersion relations for a particle using the Schrodinger equation (for non relativistic motion) and Dirac equation (for relativistic motion), and We show that for long distances the measured velocity coincides with the matter wave group velocity.

Yuri Rostovtsev
Department of Physics, University of North Texas

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