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Classical Physics as an Introduction to Relativity, Quantum Mechanics, and Gravity ROBERT CLOSE, Clark College — This poster will present classical interpretations of various phenomena associated with modern physics. Since Lorentz invariance is a property of wave equations, special relativity is derived from the assumption that matter consists of waves. Since waves propagating in opposite directions form independent states separated by 180-degree rotation, they are naturally described by spin-1/2 wave functions (Dirac bispinors). Analysis of rotational waves in an elastic solid yields all of the dynamical operators of quantum mechanics, including a simple interpretation of spin angular momentum. A spherical soliton wave model is proposed to explain violations of Bell's inequality. In general relativity, the gravitational potential is equivalent to a variation in the speed of light. Hence with a wave theory of matter, gravity may be interpreted simply as wave refraction. These classical interpretations may help students to bridge conceptual gaps between classical and modern physics.

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