



## Editorial Introduction to Applied Physics Journal January 2022

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The year 2022 holds great promise for fundamental advances in physics. Dramatic advances have been made in the understanding of the microscopic structure of matter, in crystals, amorphous materials and on the molecular level. It has also become possible to study the dynamic evolution of these materials with the help of new technology.

There have been new developments in the subject of space-time crystals, which hold promise for future technologies, along with important new results in quantum optics.

Recent development in the relativistic quantum theory, both on Minkowski space-time and on the manifold of general relativity, have made it possible to study new effects such as geometric phases in transport of the wave function around singularities.

For many years, it has been known that the radiation rotation distributions observed from galaxies do not agree with the Newtonian force law as expected from the long distance approximation to Einstein's gravitational theory, and a growing literature has discussed alternative dynamical pictures, ranging from the modified force laws suggested by Bekenstein and Milgrom to the recent developments based on the idea of retardation of the Newtonian force, following from the Einstein equation in weak field approximation. The studies on lensing effects is under way. Altogether, the studies in cosmology have received new impetus as a result of the dramatic development of the technology of observation, both of telescopes and new platforms like the Hubble.

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