1020-47-272 **I Haque*** (ihaque@uwo.ca), Department of Physics and Astronomy, University of Western Ontario, London, ON N6A 3K7, and **Mahi Singh**. *A theory of dressed particles and the Stark effect in periodic dielectric materials.*

Recently, there has been great interest in studying the linear and nonlinear optical properties of periodic dielectric materials due to their potential applications. In this paper, we have developed a theory for dressed particles and the Stark effect using the quantum statistical master equation method. The dielectric material is doped with an ensemble of nano-particles interacting with the material which acts as a reservoir. In order to study the emission spectrum of the system, two intense laser beams are applied to the material. Our expression for the emission spectral function contains a two-particle correlation function which has been evaluated using the regression theorem. Numerical simulations are performed on a material consisting of periodic dielectric spheres. It is found that, at high laser intensities, the emission spectrum splits from one spectral peak to three spectral peaks and the central peak has a linewidth smaller than that of the two side peaks. The splitting of the spectral peaks is due to the interaction between the intense beams and the nano-particles, which creates a new type of particles. Known as dressed particles, these are responsible for splitting the emission spectrum giving rise to the Stark effect. (Received August 30, 2006)