The Relativistic Particle in a Fluctuating Electromagnetic Field, D. CONSTANTINESCU, M. NEGREA, University of Craiova, Romania - The electromagnetic field which acts on the particles in an accelerator could presents fluctuations. The irregular fluctuations of the field manifest as travelling "waves" or "modes" interacting in turn with the individual particles and with themselves. In our paper we shall study, by two methods, the influence of the fluctuations on the motion of a relativistic particle. In order to keep the covariance of the equations, we firstly consider the equations in term of fluctuating potentials f and A. As a result of these fluctuations, a diffusion process appears and we shall compute the running diffusion coefficient on the perpendicular direction to the particle beam. On the other hand, we shall use the method of stochastic quantization and we shall add to the equation of motion of the relativistic particle a term which statistically is a gaussian white noise. The results obtained by the two methods will be compared.