

Dynamical conductivity of the hydrogen bonded structures in charge ordered phases

R. Stetsiv^a and R. Yurechko^b

^a*Institute for Condensed Matter Physics of the National Academy of Sciences of Ukraine, 1 Svientsitskii Str., 79011 Lviv, Ukraine,
E-mail: stetsiv@icmp.lviv.ua*

^b*National University "Lvivska Politechnika", 12 S. Bandera Str., Lviv, 79011, Ukraine*

The investigation of the charge transfer in system with hydrogen bonds is performed on the bases of proposed pseudospin-electron model [1,2]. The Hamiltonian of the model includes terms which describe the tunneling hopping of protons, electron transfer, the influence of external longitudinal field, electron-proton interaction and direct interaction between protons. Anharmonicity of the displacement of protons is described by the pseudospin formalism. Only two lowest vibrational states in the anharmonic potential well are taken into account ($s = 1/2$).

The possibility of the first- or the second order transitions from uniform phase into phase with doubled lattice period in quasi-one-dimensional structures with hydrogen bonds is studied in framework of proposed pseudospin-electron model. The phase transition lines from the uniform phase into charge ordered phase is determined. The frequency dependence of dynamical conductivity, as well as it changes with temperature and longitudinal field are obtained.

1. I.V. Stasyuk, R.Ya. Stetsiv, Yu.V. Sizonenko, *Condens. Matter Phys. (Lviv)* **5**, 685 (2002)
2. I.V. Stasyuk, R.Ya. Stetsiv, R.Ya. Yurechko, *J. Phys. Studies*, **9**, 349, (2005)