

## Soliton Properties of Light Pulses on the Surface of Ionic Crystals Generated by Strong Nonlinear Effects

NIU Jia-Sheng<sup>1,2</sup> and MA Ben-Kun<sup>1</sup>

<sup>1</sup> Institute of Low Energy Nuclear Physics, Beijing Normal University, Beijing 100875, China

<sup>2</sup> Department of Physics, Beijing Normal University, Beijing 100875, China

(Received: 2002-5-15; Revised: 2002-9-4)

**Abstract:** In this paper, we theoretically discuss the soliton properties of light pulse transportation on the surface of an ionic crystal having strong nonlinear interactions between ions of unit cells. We analyze in detail the dark solitons when the nonlinear coefficient  $g$  is positive and negative, respectively. It is found that whether the nonlinear coefficient  $g$  is positive or negative, the dark solitons can be formed over the whole dispersion relation area of surface polaritons considering nonlinear effects. Attention should be paid to the fact that around  $\omega_{T0}$ , the light pulse can form advanced dark solitons, and there is a switching area from advanced dark soliton to retarded dark soliton near  $\omega_{T0}$ . We also discuss the effects of higher nonlinear dispersion on the solitons.

PACS: 71.36.+c

Key words: soliton, polariton, light pulse

[\[Full text: PDF\]](#)

Close