# Experiments and theory in solitary waves in muscovite mica.

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It has been shown from fossil tracks and experiments with alpha particles that nonlinear excitations, travel across the closest packed of K+ planes in mica muscovite, a layered silicate [1]. Recently it has been deduced that those excitations transport also electric charge [2,3]. It has been confirmed experimentally that nonlinear excitations produced by alpha particles transport charge in muscovite [4]. Exploration of the nonlinear excitations spectrum of the $K^+$ layer shows the existence of nanopterons [5], that is, kinks coupled to a plane wave with finite amplitude. For some values of the velocity nanopterons transform in kinks with no radiation. Among them only the kinks with velocity larger than phonons in the first Brillouin zone are stable. There exist only a crowdion [6] and bi-crowdion [5] that have the right energy range and are natural carriers of electric charge. There exist also breathers with low energy that travel long distances. Exact breathers are also coupled to plane waves [7] and for some values of the velocity the amplitude the plane wave may vanish. The existence of different nonlinear charge excitations is necessary to interpret fossil tracks in which a primary quodon scatters many secondary quodons that should be much less energetic [3].

## References

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