Canadian Association of Physicists
Association canadienne des physiciens et physiciennes

Contribution ID: **4086** Type: **Oral (Non-Student) / Orale (non-étudiant(e))**

Dr

Monday 27 May 2024 14:30 (15 minutes)

A three-component description of nonlinear body waves in porous media is presented. The processes observed and described here have been patented and applied commercially to oil production and groundwater remediation. It is shown here that even if the correct nonlinear equations are used, three-component wave descriptions of porous media cannot be constructed solely from the equations of motion for the components. This is because of the introduction of the complexity of multiple scales into this nonlinear field theory. Information about the coupling between the components is required to obtain a physical description. It is observed that the fields must be coupled in phase and out of phase, and this result is consistent with the description of three- and n-body gravitational fields in Newtonian gravity and general relativity.

Keyword-1

nonlinear field theory

Keyword-2

composite material

Keyword-3

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Session Classification: (DAPI) M2-6 Applied Physics I | Physique appliquée I (DPAE)

Track Classification: Technical Sessions / Sessions techniques: Applied Physics and Instrumentation / Physique appliquée et de l'instrumentation (DAPI / DPAI)