Abstract

In this talk two formulas that connect the derivatives of the double layer potential and of a related singular integral operator evaluated at some density ϑ to the L_2-adjoints of these operators evaluated at the density ϑ' are used to recast the Muskat problem with surface tension and general viscosities as a system of equations with nonlinearities expressed in terms of the L_2-adjoints of these operators. An advantage of this formulation is that the nonlinearities appear now as a derivative. This aspect and abstract quasilinear parabolic theory are then exploited to establish a local well-posedness result in all subcritical Sobolev spaces $W_p^s(\mathbb{R})$ with $p \in (1, \infty)$ and $s \in (1+1/p, 2)$. (Joint work with Bogdan Matioc, Regensburg)