Abstract Submitted
for the DFD14 Meeting of
The American Physical Society

Thermal dispersion effects on the two-phase zone with evaporation in a porous medium MANUEL PERALTA GUTIÉRREZ, Univ Nacl Autonoma de Mexico, OSCAR BAUTISTA, Instituto Politécnico Nacional — The one-dimensional steady-state heat transfer in a two-phase zone of a water-saturated porous medium is studied numerically by including thermal dispersion effects. The physical system consists of a porous medium-liquid-vapor mixture that is heated from above and maintaining a fixed temperature on the bottom surface. Under certain conditions, a two-phase zone of both vapor and liquid exists in the middle of the region of the porous medium. A mathematical model for the temperature and the liquid saturation profiles within this two-phase zone is formulated by allowing for explicit temperature dependence for the saturation vapor pressure together with explicit saturation dependence for the capillary pressure. The set of resultant equations is numerically integrated by using a conventional fourth order Runge-Kutta scheme. The results evidence the strong influence of the thermal dispersion, porosity and pore diameter on the two-phase zone. R_1R_3

Manuel Peralta Gutiérrez
Univ Nacl Autonoma de Mexico

Date submitted: 07 Aug 2014 Electronic form version 1.4