

Abstract Submitted  
for the MAR13 Meeting of  
The American Physical Society

**Ion-size effects in HTS cuprates – dielectric versus magnetic pairing** JEFFERY TALLON, MacDiarmid Institute, Industrial Research Ltd, BEN MALLETT, MacDiarmid Institute, Victoria University, NEIL ASHCROFT, LASSP, Cornell University — We have been exploring the systematic effects of changing ion size on superconducting and normal-state properties of the HTS cuprates. In the model system  $RA_2Cu_3O_y$  (where  $R = La, \dots, Lu$  and  $A=Ba_{2-x}Sr_x$ ) the maximum  $T_c$  in the dome-shaped phase curve can be shifted from 70 to 110 K in the model system. Surprisingly  $T_c$  correlates with the dielectric properties and not the magnetic properties. This highlights the fundamental importance of charge fluctuation and dielectric screening in the cuprates and may signal a novel pairing mechanism having its origin with quantized waves of electronic polarization.

Jeffery Tallon  
MacDiarmid Institute, Industrial Research Ltd

Date submitted: 02 Nov 2012

Electronic form version 1.4