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Imaging chemical disorder in cuprates using scanning tunneling microscopy[1] ILIJA ZELJKOVIC, DENNIS HUANG, CAN-LI SONG, Harvard University, TAY-RONG CHANG, National Tsing Hua University, Taiwan, HORNG-TAY JENG, Institute of Physics, Academia Sinica, Taipei, ZHIJUN XU, JINSHENG WEN, GENDA GU, Brookhaven National Laboratory, JOUKO NIEMINEN, Tampere University of Technology, Finland, ARUN BANSIL, ROBERT MARKIEWICZ, Northeastern University, JENNIFER HOFFMAN, Harvard University — High-T_c cuprate superconductors are chemically, electronically and structurally inhomogeneous at the nanoscale. Although a body of theoretical work has predicted that local and global superconductivity may be dramatically impacted by particular dopant configurations, the exact positions of dopants introduced into cuprates to induce superconductivity are generally unknown. Here we use scanning tunneling microscopy to reveal the intra-unit-cell location of two different types of oxygen dopants in $Bi_{2+y}Sr_{2-y}CaCu_2O_{8+x}$. Furthermore, we show the relationship between these interstitial oxygen dopants, oxygen vacancies, and a global structural buckling known as the supermodulation. We compare our findings to theoretical simulations.

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