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## **[128] Electronic correlations in novel superconductor $\text{Ba}_2\text{CuO}_{3+y}$**

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Cuprates are prototypical for high-temperature superconductivity and host a vast family of compounds. Recently, the new  $\text{Ba}_2\text{CuO}_{3+y}$  cuprate superconductor has been discovered, which challenges the previous physics picture in other cuprate superconductors by (1) exhibiting superconducting only in a narrow 'highly overdoped' doping region ( $y=0.2$ ) (2) hosting a different Fermi-surface; To shed light onto this most unusual cuprate we use density-functional-theory (DFT) combined with dynamical-mean-field-theory (DMFT) and reveal that correlation effects drive a charge-transfer between  $\text{CuO}_{1.5}$  and CuO planes in  $\text{Ba}_2\text{CuO}_{3.2}$ , which leads to a quasi 1D  $d_{y^2-z^2}$  band, instead of the common 2D  $d_{x^2-y^2}$ . This discovery offers a new theoretical explanation to understand the recently discovered superconductor  $\text{Ba}_2\text{CuO}_{3.2}$ .

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