The 1987 High-Tc ‘Woodstock’ Session and High-Tc at IBM

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Session B1: 20th Anniversary of High-Tc Superconductivity
‘Woodstock’ Session
2007 APS March Meeting
Talk B1.00005, 12:03 PM - 12:15 PM
Monday, 5 March, CCC Four Seasons 2-3
Denver, Colorado

http://www.w2agz.com/woodstock07.htm
Susceptibility Measurements Support High $T_c$ Superconductivity in the Ba-La-Cu-O System.

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(received 15 Oct 1986)

PACS. 74.70.-b
PACS. 74.10.+v
PACS. 74.70.Nr

Abstract. — The susceptibility of ceramic samples in the metallic Ba-La-Cu-O system has been measured as a function of temperature.
* Superconductivity at 30K is a reality!

* IBM Zurich Research Strikes Again

* Japan Inc. is moving fast once again but so are we (I hope)
\[ \Delta c = 1.4 \gamma T_c \Rightarrow \frac{\Delta c}{c}_{30k} \leq 4\% \]
ZURICH OXIDE BLC021

\[ C/T = \varepsilon T + \beta T^3 \]

\[ \varepsilon = 2.08 \times 10^{-7} \left( \text{J/mole-K}^2 \right) = 5.9 \text{ mJ/mole-K}^2 \]

\[ \beta = 1.80 \times 10^{-8} \left( \text{J/mole-K}^2 \right) \]
St. Patrick's Day 1987

“The First…and Only…Talk on High-Tc to be found in the March Meeting Bulletin”

Electronic Properties of Oxide Superconductors
IBM Research – Yorktown, Almaden

1. “Low Tc” superconductors
   $T_c = 30-40 \text{K}$
   $La_{2-x}M_xCuO_4$, $M = Ca, Ba, Sr$

Müller – Bednorz
IBM Zurich – 1986

2. “High Tc” superconductors
   $T_c = 90-100 \text{K}$
   $Y_{1.2}Ba_{0.8}Cu_2O_x$, Multiphase sample
   (Black, green, others)
   Chu, Wu et al. Houston, Alabama University
   PRL – March 3, 1987

3. Very high $T_c$?
SUPERCONDUCTIVITY ABOVE 90K IN THE COMPOUND YBa$_2$Cu$_3$O$_x$:
STRUCTURAL, TRANSPORT AND MAGNETIC PROPERTIES

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(Received 16 March 1987)

ABSTRACT: We report the structural, transport, and magnetic properties of the principal black
phase responsible for superconductivity in the recently discovered YBaCuO compounds with
transition temperatures greater than 90K.
$YBa_2Cu_3O_x$

A new oxygen deficient perovskite

$Z = 7$

$b = 11.69\text{Å}$

$a = 3.82\text{Å}$
Zero TEP at 40K in an electrically insulating sample of "pure" La$_2$CuO$_4$!

- January, 1987 -
Woodstock Wrap-up
John Cooper, UCLA
3 AM, 19 March 1987
Physicists’ Night Out!

WHAT IS MORE EXCITING THAN
High Tc — Physics Art!

PAM DAVIS
STEVE KIVELSON
DAN ROKHSAR and
SHAHAB STEMAD

invite you to

LIMELIGHT

FOR DANCING
AT NEW YORK'S MOST FASHIONABLE NIGHTCLUB

THURSDAY, MARCH 19, 1987

DOORS OPEN 10:00 PM SHARP
DANCING ALL NIGHT

COMPULSORY ATTENDANCE FOR ALL: AND A GLASS WITH THIS INVITATION

THE INVITATION CANNOT BE SOLD OR TRANSFERRED
- Synthesis
  E. Fugger, Y. Lee, A. Haddal

- Characterization
  R. Bevers, T. Shaw (yet),
  G. Lim, R. Candy

- Measurements
  S. Parkes, J. Kaufman,
  M. Ramirez, J. Variquez,
  P. Grant

- Theory
  F. Herman
This is the formula for something that looks ordinary, but does something extraordinary.

It is a superconductor, a material that carries electricity with no loss of power. Until recently, superconductors worked only at extremely low temperatures, limiting their use.

In a major breakthrough, two IBM scientists discovered that this class of materials superconducts at a much higher temperature, raising the possibility of expanding this technology’s use.

This discovery, by J. Georg Bednorz and K. Alex. Müller, has sparked an explosion of research that could yield profound change. In fact, many think that if remaining obstacles can be overcome, superconductors could lead to major advances in many areas of human endeavor including computers.

IBM is proud of its scientists’ innovative achievement.

Because innovation not only makes breakthroughs possible. It makes better products for our customers possible. IBM

La$_{2-x}$Ba$_x$CuO$_4$