

# The 1987 High-Tc 'Woodstock' Session and High-Tc at IBM

Paul M. Grant

IBM Research Staff Member, Emeritus

Session B1: 20<sup>th</sup> 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>



Sent to me 10/15/86

to Rick Greene  
H. Prox (Matem.)

Susceptibility Measurements Support High  $T_c$  Superconductivity in the  
Ba-La-Cu-O System.

J. G. BEDNORZ, M. TAKASHIGE (\*) AND K. A. MÜLLER

*IBM Research Division, Zurich Research Laboratory,*

*CH 8803 Rüschlikon, Switzerland*

(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.

Journal Club 12 Dec 1986

- Superconductivity at 30K is a reality!

- IBM Zurich Research Strikes Again

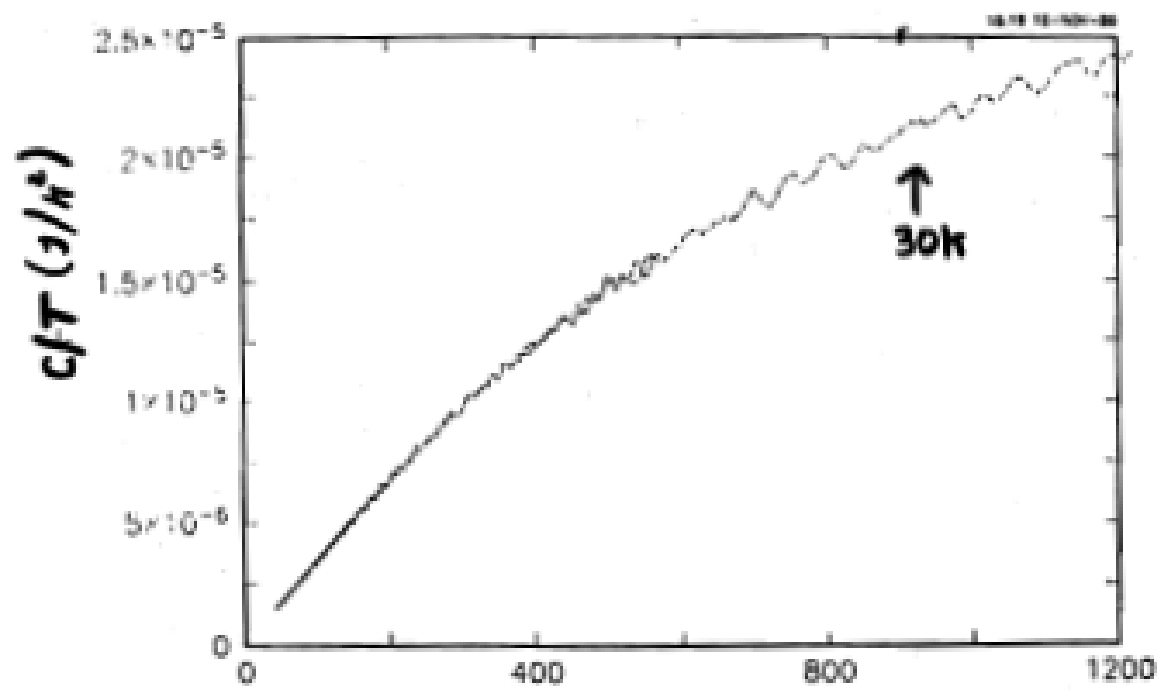
- JAPAN INC. IS MOVING FAST ONCE AGAIN  
but so are we (I hope)

YKT Journal Club

RLG Talk

12 December 1986

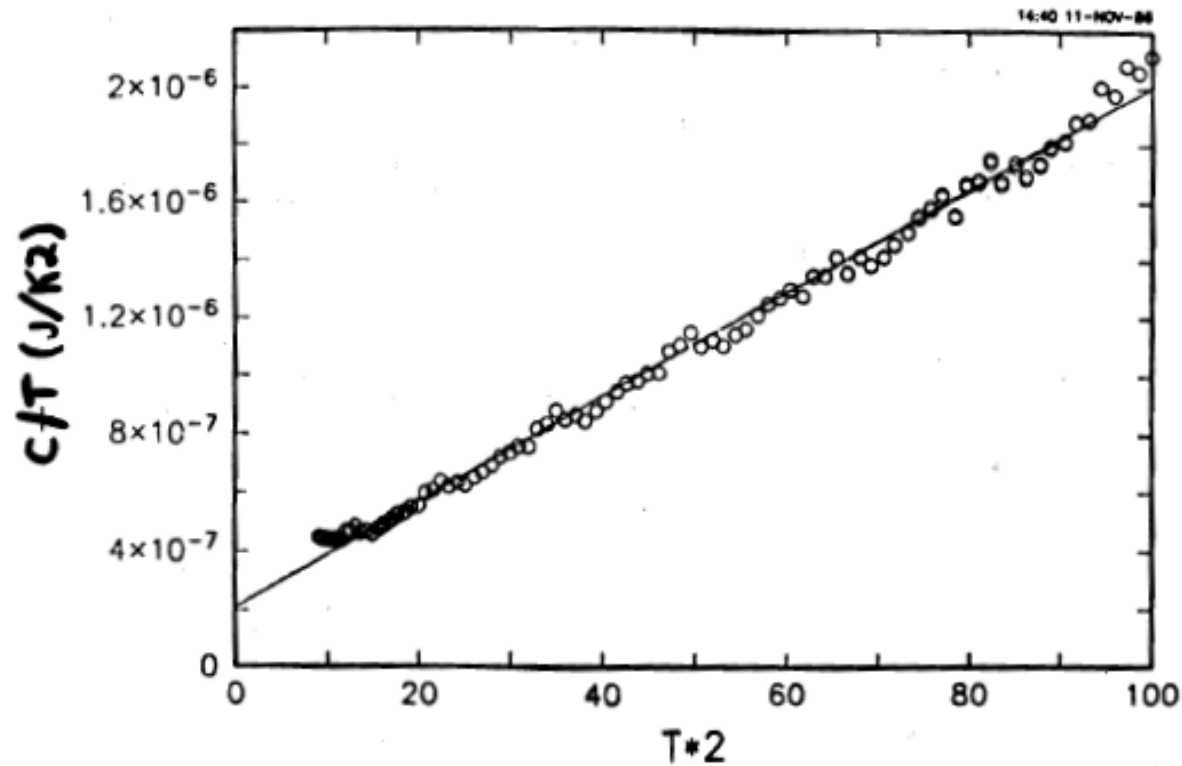
ZURICH OXIDE + BG



$$\Delta C \approx 1.4 \delta T_c \quad \Rightarrow \quad \frac{\Delta C}{C} \Big|_{30K} \approx 4\%$$

Greene - Torressen - von Molnar - Muller-  
Bednorz

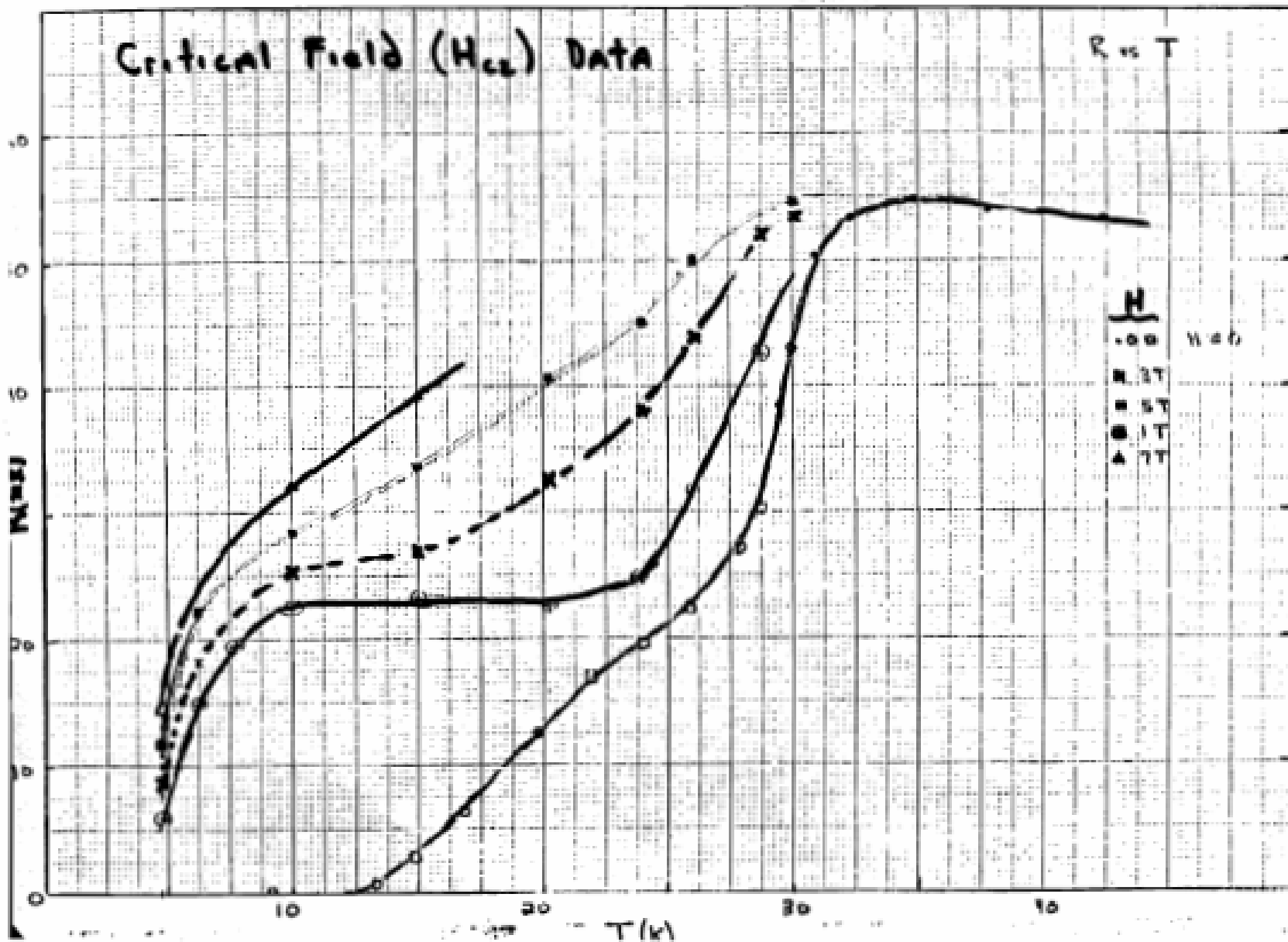
ZURICH OXIDE BLC021



$$C = \gamma T + \beta T^3$$

$$\gamma = 2.08 \times 10^{-7} \text{ (J/K}^2\text{)} = 5.9 \text{ mJ/mole-K}^2$$

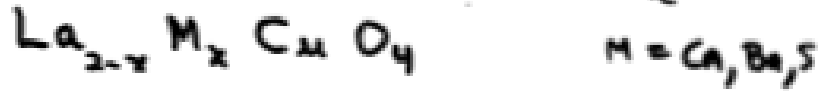
$$\beta = 1.80 \times 10^{-8} \text{ (J/K}^3\text{)}$$



# Electronic Properties of Oxide Superconductors

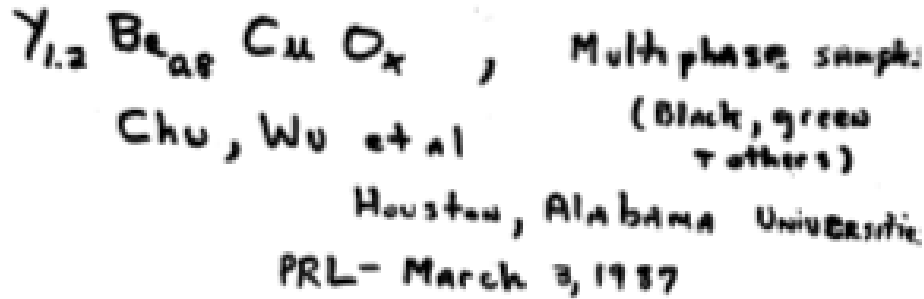
IBM Research - Yorktown, Almaden

- ① "Low  $T_c$ " superconductors  $T_c = 30-40K$



Mueller - Bednorz  
IBM Zurich - 1986

- ② "High  $T_c$ " superconductors  $T_c = 90-100K$



- ③ Very high  $T_c$  ?

## St. Patrick's Day

1987

"The First...and Only...Talk on High- $T_c$  to be found in the March Meeting Bulletin"

SUPERCONDUCTIVITY ABOVE 90K IN THE COMPOUND  $\text{YBa}_2\text{Cu}_3\text{O}_x$ :  
STRUCTURAL, TRANSPORT AND MAGNETIC PROPERTIES

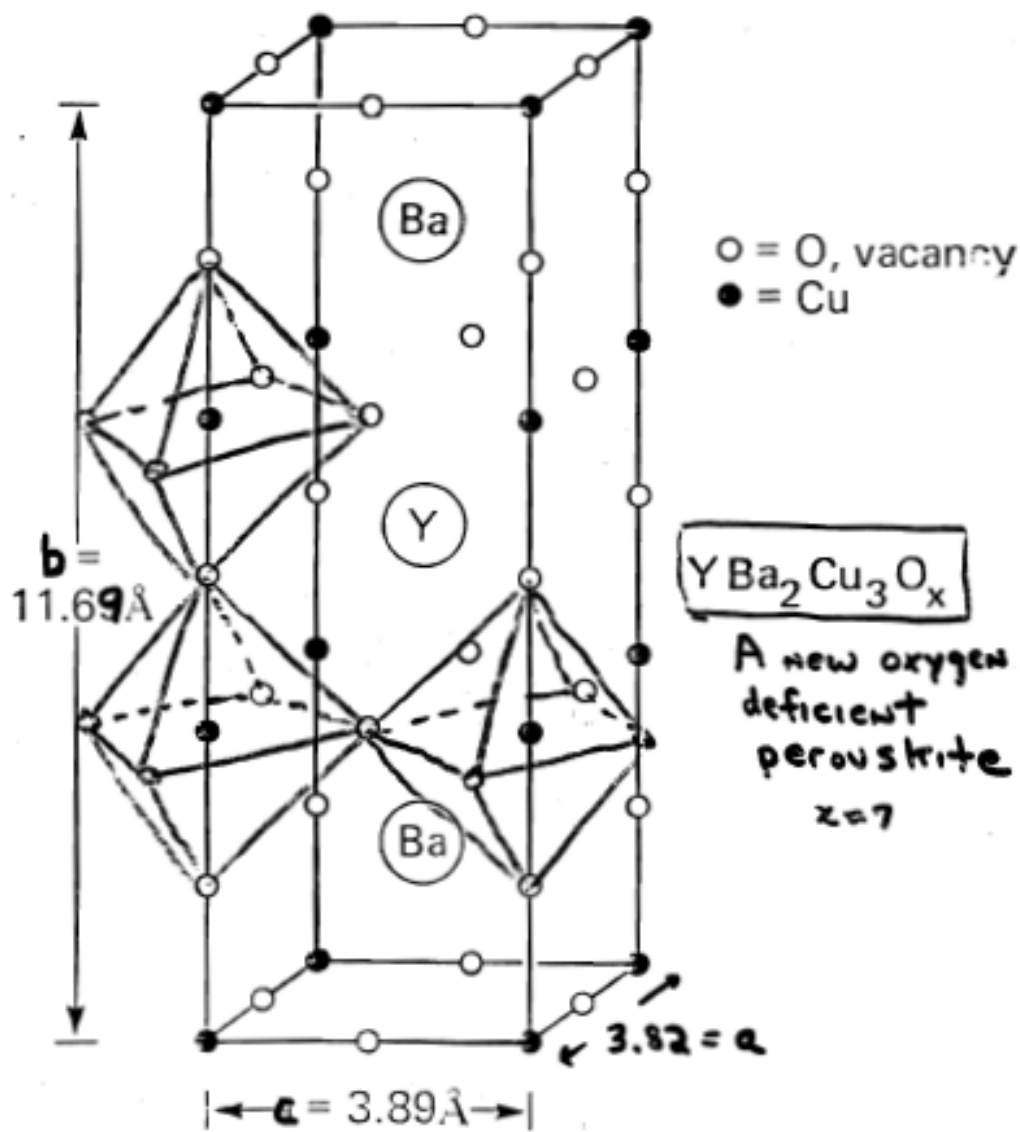
P. M. Grant, R. B. Beyers, E. M. Engler, G. Lim, S. S. P. Parkin,  
M. L. Ramirez, V. Y. Lee, A. Nazzari, J. E. Vazquez and R. J. Savoy

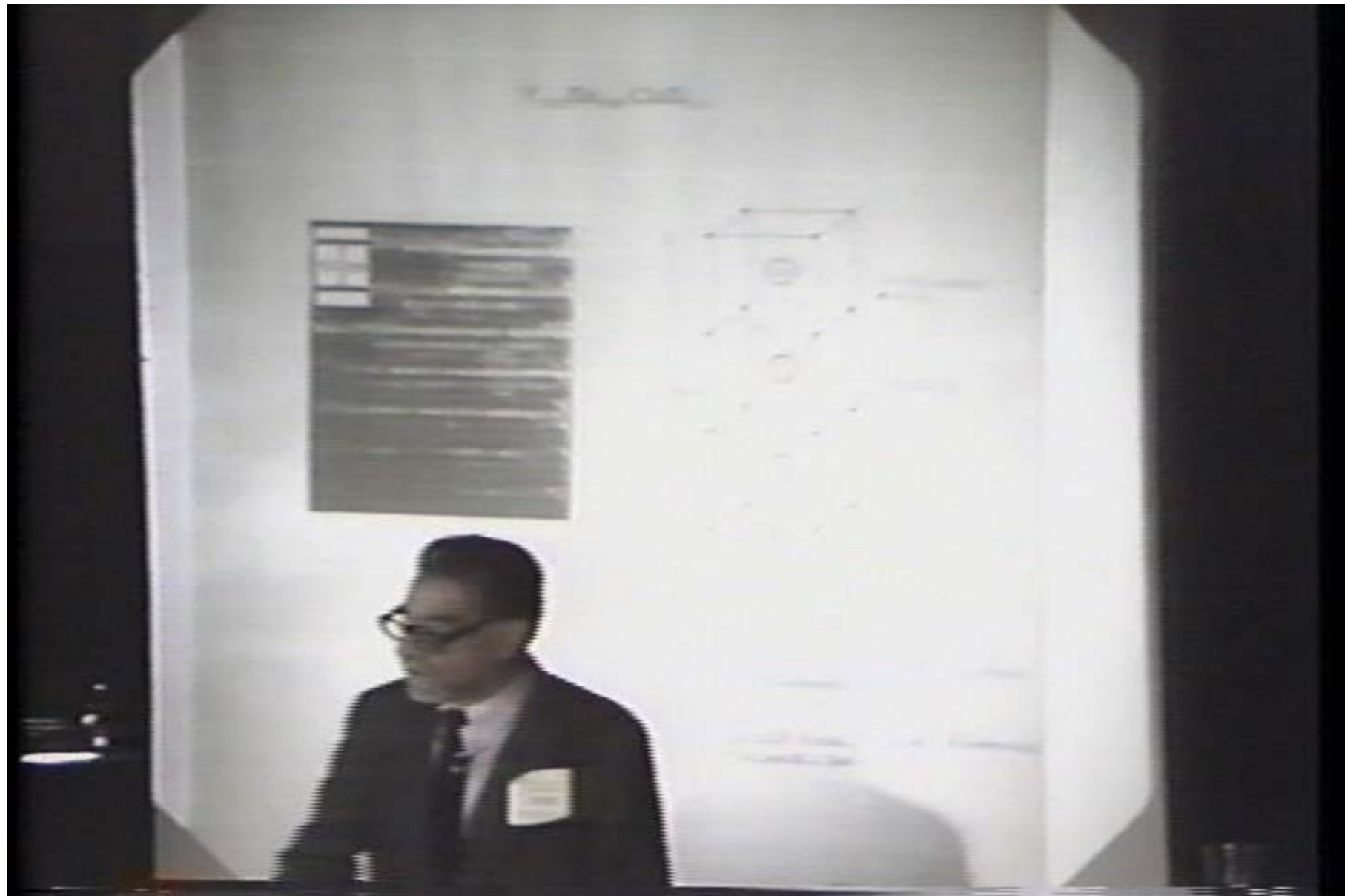
IBM Almaden Research Center  
San Jose, CA 95120

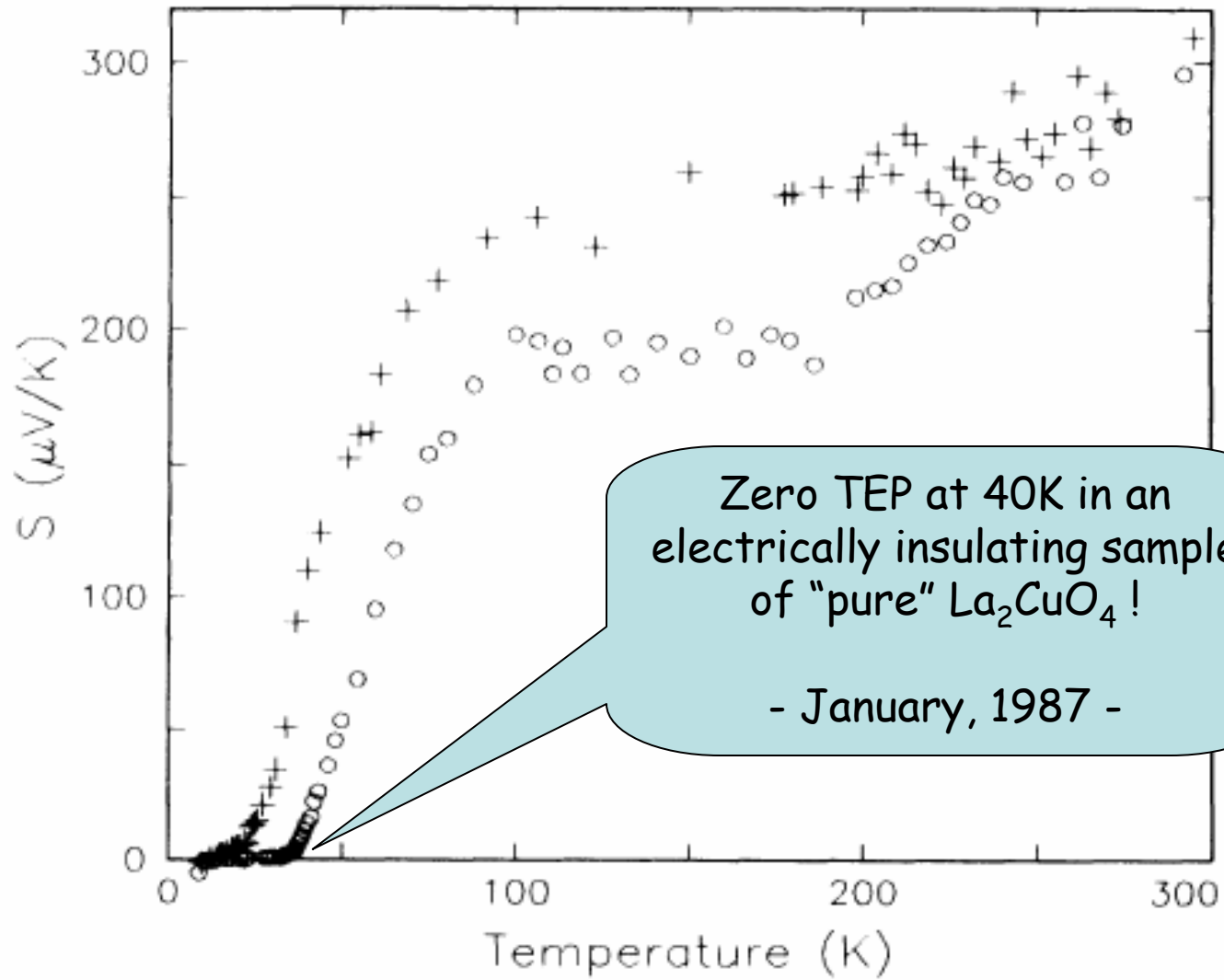
*(Received at Nature 1987)*

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

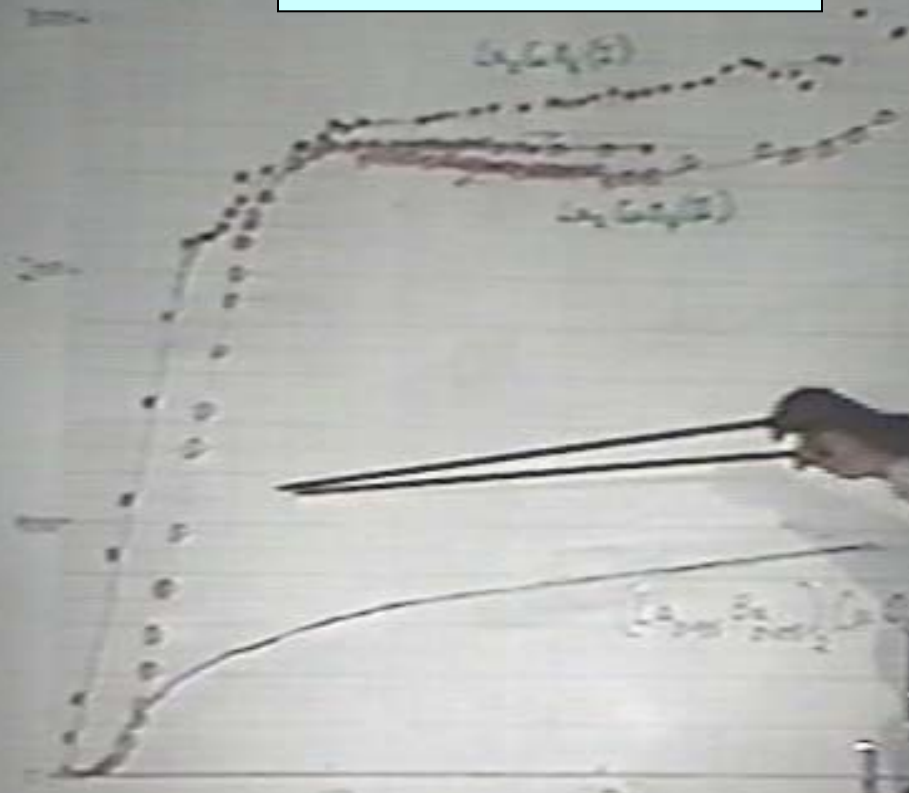








Woodstock Wrap-up  
John Cooper, UCLA  
3 AM, 19 March 1987



# Physicists' Night Out!

WHAT IS MORE EXCITING THAN  
**High T<sub>c</sub> — Physics Art!**

**PAM DAVIS  
STEVE KIVELSON  
DAN ROKHSAR and  
SHAHAB ETEMAD**  
present

**LIMELIGHT**  
HOUSE OF MUSIC NYC

**FOR DANCING  
AT NEW YORK'S MOST FASHIONABLE NIGHTCLUB**

● ● ● ● THURSDAY, MARCH 19, 1987 ● ● ●  
DOORS OPEN 10:00 PM SHARP  
**DANCING ALL NIGHT**

COMPULSORY ADMISSION FOR VC; AND A GLASS WITH THIS INVITATION  
SEE WEBSITE FOR DETAILS

THIS INVITATION CANNOT BE SOLD OR TRANSFERRED

• SYNTHESIS

E. FUGER, V. LEE, A. WAZZAL

• CHARACTERIZATION

R. BEYERS, T. SHAW (YKT),  
G. LIM, R. CADDY

• MEASUREMENTS

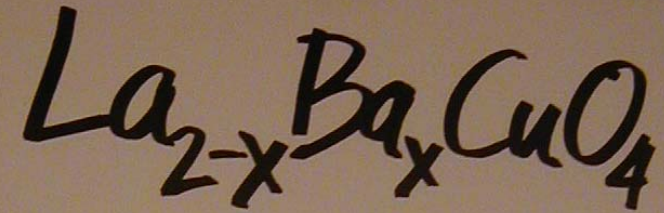
S. PARKIN, J. KASTMAN,  
M. RAMIREZ, J. VARDOLIS,  
P. GRANT

• THEORY

S. WERMAN







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**



