

## GAUGE THEORY OF PAIRING AND SPIN FLUCTUATIONS NEAR A QUANTUM CRITICAL POINT

J.R. Schrieffer (FSU, Physics)

---

We have developed a highly novel gauge transformation which solves the HTS problem in closed form. We find  $T_c$  is highest for ferromagnetic spin fluctuations. The pairing is p-wave, singlet in this case.

We find

$$T_c = 1.14 \omega_{sf} e^{-\frac{1}{\lambda}} \quad [1]$$

where

$$\lambda = (J/W)^2 \text{ for } JCW \quad [2]$$

and

$$\lambda = (W/J)^2 \text{ for } J > W \quad [3]$$

These results are currently being verified experimentally. Estimates show that \$10<sup>12</sup>/year will be saved world wide if these novel materials are used in 10% of the world wide electric power industry.

$Hc_2 \sim 10^{13} T$  and  $jc \sim 10^{13} \text{ Amps} / \text{cm}^2$  are predicted by the theory.