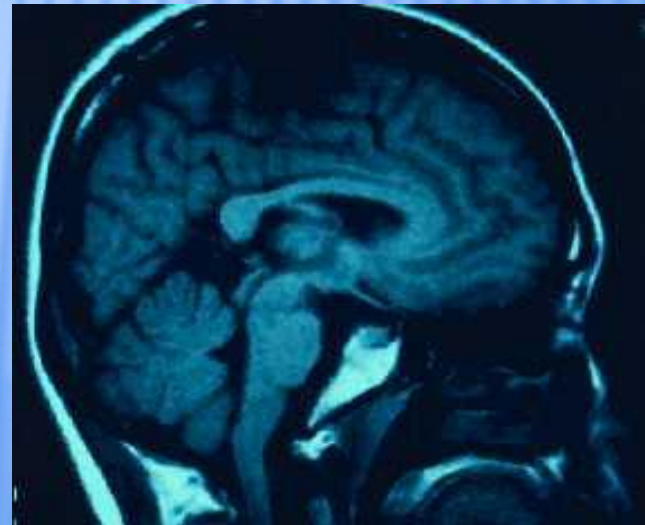


# Application of Superconductors

- Particle Accelerators
- Generators
- Transportation
- Power Transmission
- Electric Motors
- Military
- Computing
- Medical
- B Field Detection (SQUIDS)



**The Yamanashi MLX01 MagLev train**

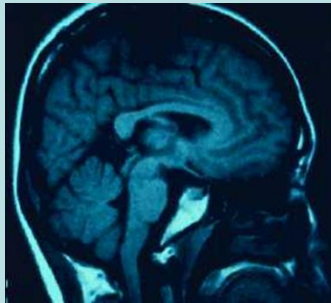


# Applications using Superconductors

- Transportation  
Maglev trains



- Medical  
MRI diagnostic tool



- Energy

Wind turbine

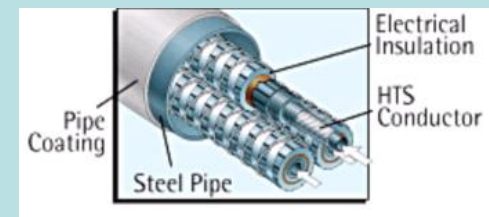
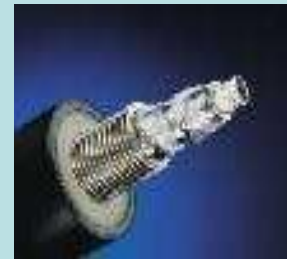
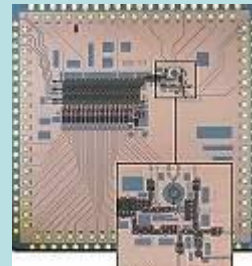
Superconducting Magnets

Josephson Devices

Power transmission

Fault-current limiters

Electric motors



# Applications using Superconductors

## ➤ Transport



In Jan 08, the Central Japan Railway Company (JR Central) announced that it plans to construct the world's fastest train, a second-generation maglev train that will run from Tokyo to central Japan.

Cost ~ 44.7 billion dollars

Completion in 2025

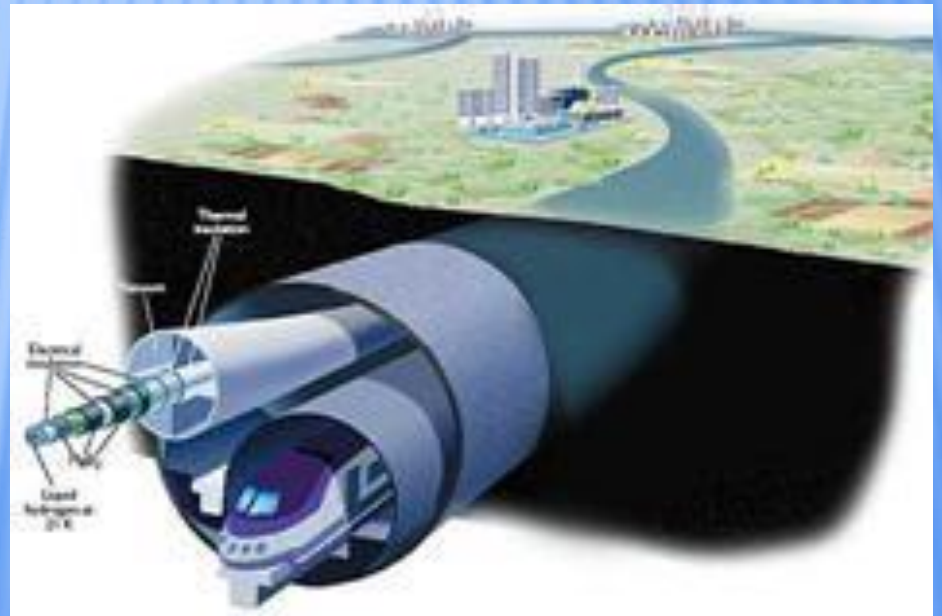
Speed ~ 500 kilometers per hour

Length ~ 290 kilometers

# Applications using Superconductors

## Superconducting power transmission

- currently we waste ~ 20 % of our energy just transporting it around
- potentially the next industrial revolution





**The few ultra-thin HTS wires on the right carry as much power as all the copper shown on the left. Superconductor wire carries 150 times the current the copper wire with the same cross section. (Courtesy to American Superconductors Co.)**

# Conclusion

Research in superconductivity has a long history, in part because of its important applications to measurements and material science. **The recent discovery of materials with unexpectedly high superconducting transition temperatures has brought renewed interest in the science and technology of superconductors throughout the world. It is evident that this field is still controversial. The difficulty to explain the high  $T_c$  values as well as other anomalous superconducting and normal state properties of the HTSC's necessitates further studies and search for empirical relations in the large amount of collected data.**

# Conclusions

The many uses for superconductivity means that many of the technological tools required to exploit new materials are in place.

The new materials discovered in the last 20 years were found by relatively small determined groups.

Using world-class science to produce technology is tough. It requires first class scientists, time, perseverance, creativity, luck and funding.

Superconductivity offers excellent science, excellent technology, excellent training and the possibility of saving the planet !!



***Thanks for  
your Attention!***



*Mortady Youssif*