



# Tunnel Layout Configurations

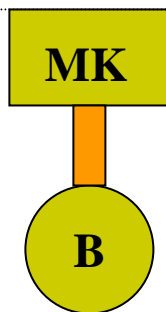
Snowmass ILC Workshop

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Nan Phinney (slides from Ray Larsen)

# Options vs. Tunnel Topologies

M=Modulator  
 K=Klystron  
 B=Beam  
 X=Step-up Xfmr  
 ■ = Cables  
 ■ = Waveguide



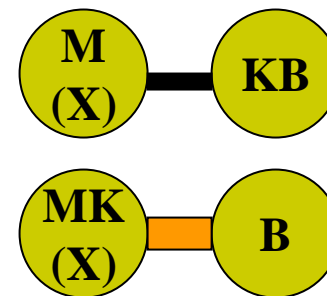
*1. SLAC: Gallery + Shallow Tunnel*



*2. TESLA: Spaced Surface Huts + Deep or Shallow Tunnel*

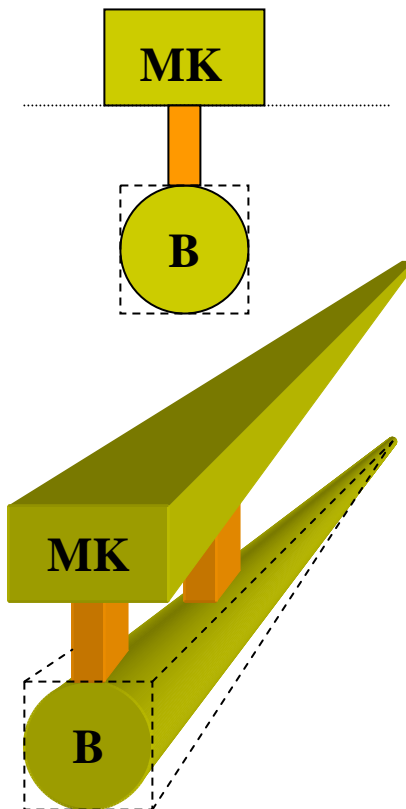


*3. Single Tunnel Deep or Shallow*



*4. Dual Deep Tunnels*

# Surface Gallery + Shallow Tunnel



Shallow tunnel

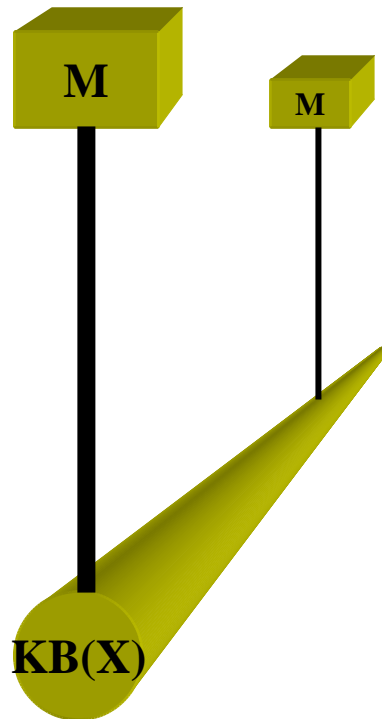
Bored or rectangular cut and cover

~10 m deep waveguide feed penetrations every 40m (~1000 total)

M-K co-located on surface for easy access

n/N redundancy for energy overhead in case of failure

# Spaced Surface Huts + Deep or Shallow Tunnel



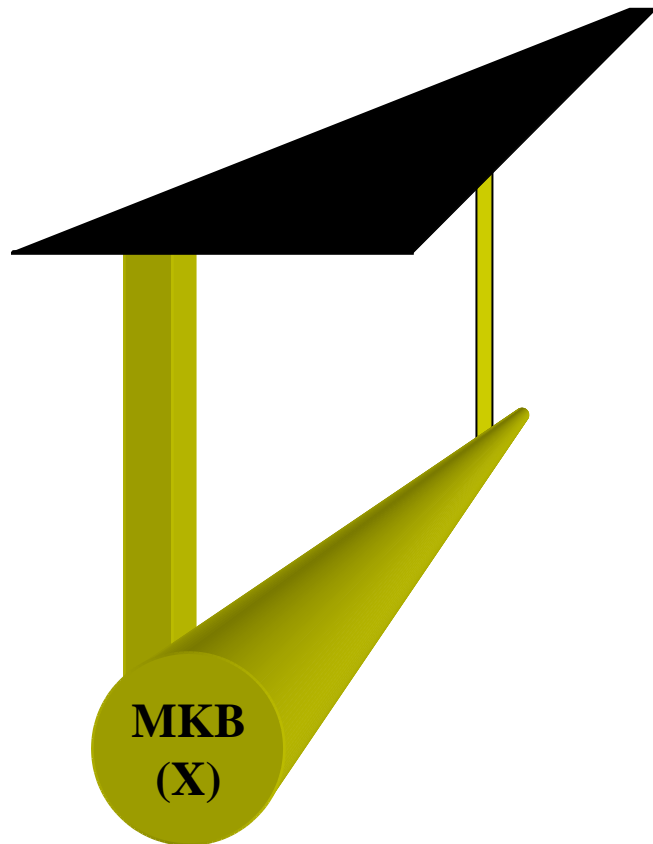
Modulator cluster in huts  
service up to 2.5 Km  
sector

Klystrons in beam tunnel

Cables HV or LV + X

Modulators easily accessible,  
klystrons and Xfmr not

# Single Tunnel Deep or Shallow



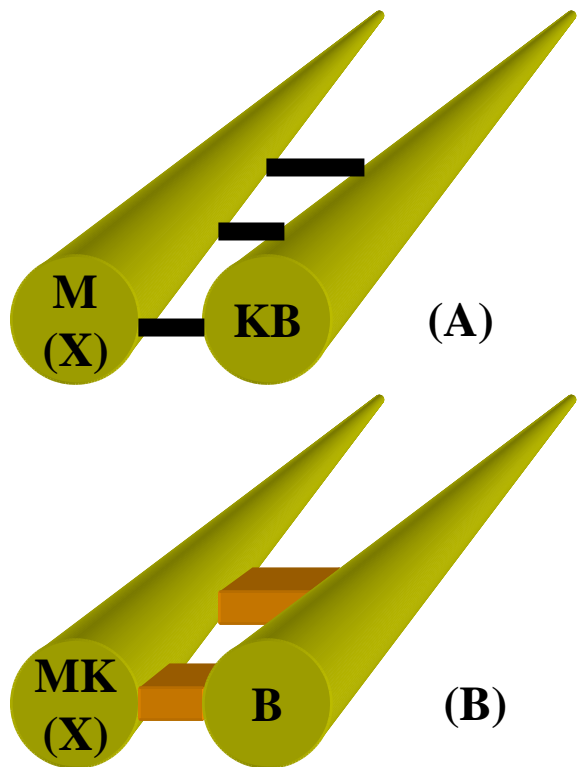
Modulators & Klystrons  
co-located in beam  
tunnel

Access Penetrations  
every  $n$  Km

All electronics in beam  
tunnel

Shield electronics from  
neutron, gamma flux

# Dual Deep Tunnels



Modulators and/or klystrons  
accessible via 2<sup>nd</sup> tunnel

Access every  $n$  Km

Lateral penetrations every  
~40 m for short WG or  
cable feeds

*Fig. A:* Klystrons inaccessible  
in beam tunnel – LV/HV  
Cable feed

*Fig. B:* Klystrons accessible  
co-located in service  
tunnel – Waveguide Feed

# Availability Rankings

1. Near-surface building w/ all RF accessible
2. Twin tunnel with all RF components accessible.  
Penalty for more difficult deep tunnel access.
3. Single tunnel with huts for modulators.  
Penalty for inaccessible cable plant, transformer, klystron.
4. Single deep tunnel with all components inside  
However, may be greatly improved with modular design (see talk in WG2 session).