Working Group on Environmental Control

Midterm summary

Snowmass 2001, July 12

Wilhelm Bialowons (DESY), Chris Laughton (Fermilab), Andrei Seryi (SLAC)

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Activity highlight

- **Ground motion sessions** July 3-7
  - Fast; slow; diffusive; systematic ground motion, effect on NLC, TESLA, VLHC
  - Tunnel and vibration interaction; influence of geology, location, depth, shallow site resonances
- **Tunneling workshop** July 9-10
  - Two day dialog with invited experts on tunneling, design, construction, ground and site investigation

- **Stabilization workshop** July 14
  - Feedbacks to stabilize beam and collisions; active stabilization of focusing elements
- **NPSS Technology school** July 17, PM
- **NPSS Noon lecture** July 18

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Midterm recommendations GROUND MOTION

- Investigation of slow motion at representative sites
- Investigation of vibration at representative sites
- Investigation of resonances of shallow sites
  - Maybe a reason for larger noise at some sites
- Understand effect of depth/layered ground and use it to minimize noise
  - Benefits of soft top layer and deep tunnel
- Develop / apply methods damping in-tunnel generated noises
  - Learn from LIGO

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Midterm recommendations TUNNELING

- **Need for preliminary site investigation of proposed CA and IL sites** (shale swelling properties, hydrology, in-situ stresses, faults)
- Need for **constructability review of underground sites** to ensure compatibility with contractor methods and means
- **Tunneling R&D** – be informed, but be aware that too much tunneling R&D may increase risk of the project
- **International Advisory Board on Tunneling** – similar to Machine Advisory Committees on accelerators
- **Methodology, prioritized list of criteria – how to select a site – need to minimize number of sites**
  (ground motion and vibration, tunneling, impact on local community; looking for guidance on getting permission on site investigation)

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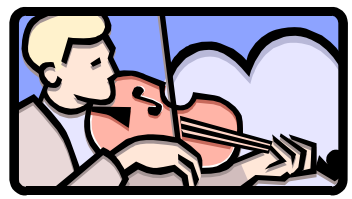
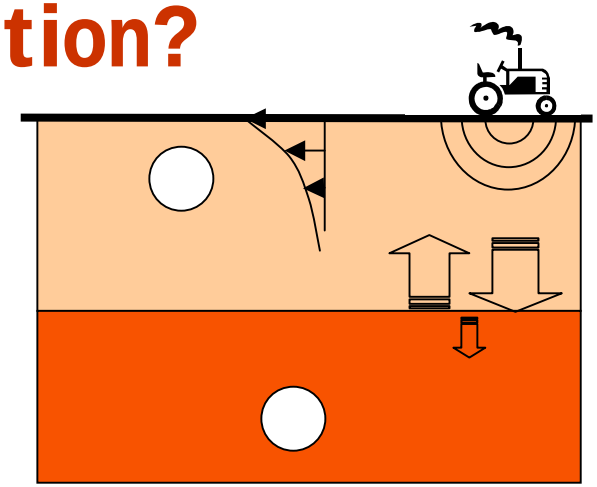
Come to NPSS school and lunch lecture and find out…

- How fast is “fast” ground motion?

- What is “cultural” noise and why we do not like it ?



- What is diffusive ground motion?



- Why do we like deep tunnels ?

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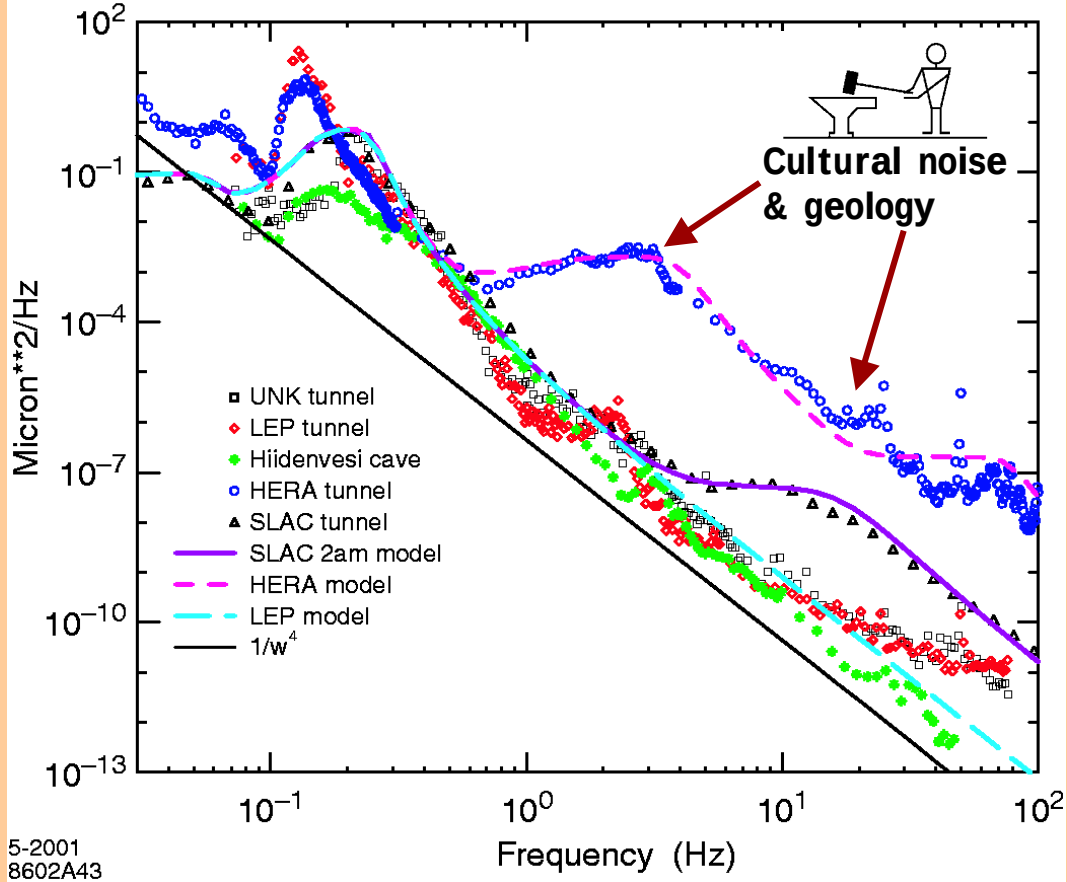
Come to NPSS school and lunch lecture and find out…

- How human activity and site resonances influence ground motion amplitude ?



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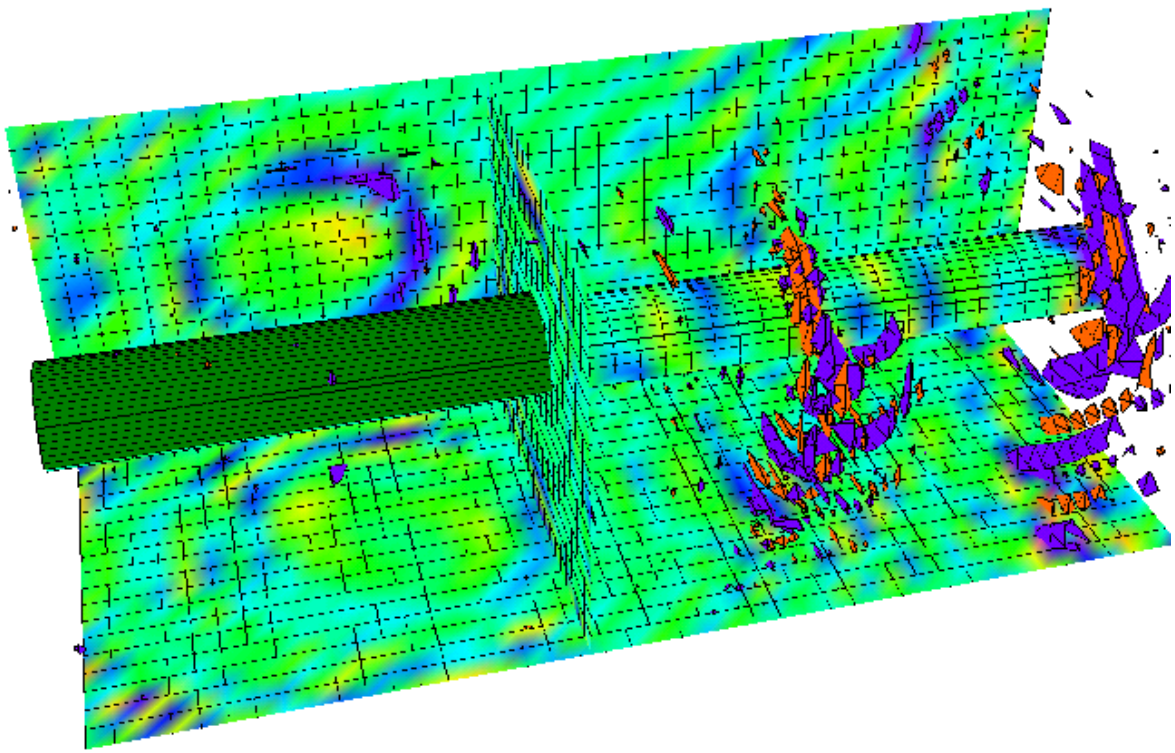
- How to look ahead of a Tunnel Boring Machine?



NSA Engineering, Inc.
Ground Imaging Technology

TRT™ Reflection Imaging Ahead of TBM

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NPSS Technology school, July 17, PM
NPSS noon lecture, July 18

Tuesday July 17, PM

Ground motion, Optimal Tunneling and Environmental Considerations for Future Colliders

Ground motion in future colliders — Andrei Seryi (SLAC)

Optimal tunneling for future colliders — Wilhelm Bialowons (DESY), Chris Laughton (Fermilab)

Conventional alignment - Now and in the future — Catherine LeCocq (SLAC)

Beam based alignment - From an art to indispensable everyday tool — Peter Tenenbaum (SLAC)

Wednesday July 18, noon

Ground motion effects in future accelerators
- what accelerator and non-accelerator physicists should know about it

Andrei Seryi (SLAC)