[ WARNING: Flashing Lights in Videos ]

ColliderScope: Reaching new audiences w/ Electronic(s) music

Lawrence Lee

Production with Tova Holmes (UChicago)
I work on ATLAS

When I’m not searching for BSM physics, I’m in the lab working on our muon upgrade.
In lab, I work a lot with scopes…

Remember old analog scopes?

So satisfying to play with

…though a lot less practical…
“Oscilloscope music”

What if you make stereo sounds

Whose waveforms draw images if piped into a scope in XY mode...

Jerobeam Fenderson - Planets

538,751 views

YouTube Channel for Jerobeam Fenderson
R vs T

L vs R

L vs T

YouTube Link
Audio waveform encodes the visual show. Play WAV file [cern.ch/ColliderScope] into a scope and see the images.

Shape ↔ Timbre
Speed ↔ Pitch
The project has been a huge success.

Someone even played it on their own scope and posted it to YouTube! User: konohh
Easy/cheap outreach display at your institute!

- WAV FILES FROM CERN.CH/COLLIDERSCOPE
- CHEAPO MP3 PLAYER
- Headphone out
- Super cheap RCA-BNC adapters
  10 for ~$5
- OLD ANALOG SCOPE FROM STORAGE

If you do this, let me know! I'd love to highlight it.
ColliderScope @ Music Festivals

CERN has a growing program of Science Pavilions at music festivals, run by Connie Potter

Created songs to introduce the programs and have been received well with audiences

YouTube Link to Roskilde Intro
ColliderScope Live

Huge privilege of being given a stage at **Pohoda Festival**. Biggest in country. 30k attendees.

Hour-long set at the stage for experimental electronic music

15 minute intro presentation: LHC, the science of sound, electronics

Live 45 minute electronica/hip-hop set w/ projected scope trace

Each shape is sampled and repitched to make melodies that draw pictures

See clips from the set on YouTube
Electronic(s) Music

Make live music with repurposed electronics from old experiments

Brings us full circle back to the electronics of particle physics

LV Control Panel for UA1 Muon System
NIM Power Supply from SSCL

VME Switch Array from OPAL
I chose a small stage, which I used to play for hours last year and enjoyed great musical insights, featured the project ColliderScope, founded by Lawrence Lee, an American. This particle accelerator man at CERN created parts of his old instruments with his musical instrument, which uses mathematical knowledge of the universe to produce sounds, and has done a great electronic set with his help.

After this musical introduction, the main stage has already begun to come to life through the sounds, and you suddenly did not know where to go, unless it was as clear as I did not miss P/ST, a pair of guys who met at DAMU and made it to the final round of Starter by radia Wave. At Pohoda it was their seventh concert at all, and for those who haven’t experienced it yet, there is a possibility to visit Beseda u Bightu, where they will perform on the same day as creating similar WWW Neurobeat. Rapper Dan Kranich and musician Ivo Sedlacek send their audience to ecstasy. They are crowded with energy and power, they seem to want to conquer the world. Piece Landscape without a Door is a complex poetry in a cheeky design, has an existential aftertaste (but you know it, do you know?) And to this great musical component, I highly recommend and I tend to share the opinion of the group who stood by the railing with me - “This is my headliner!”. A nice bonus was 4 copies of the CD, whose metal wrappers were made by Dan rapper. Yes, we have it at home, a

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On Friday, at 12:20, Lawrence Lee will stop at the CCC Club to introduce the ColliderScope Experimental Music from Experimental Physics project.

ColliderScope is a musician and physics project on the Great Hadron Accelerator at CERN. With a unique form of synthesis, it paints dynamic images directly with the sound using an oscilloscope. Audio waves are designed to show images from the world of experimental particle physics. By converting old instrument waste from past musical instrument experiments, it creates a
Gives the public exposure to:

PHYSICS OF SOUND
FOURIER ANALYSIS
ELECTRONICS
PARTICLE PHYSICS

all on the dance floor or in their headphones
Music is the ultimate form of outreach

Mostly everyone interacts with music. It cuts deep into the core of our culture.

There are ways for scientists to use music for public engagement and outreach.

Project not just the science geeks, but Slovakian festival-goers looking to dance.

For the music world, I’ve made a sample pack for people to make their own LHC oscilloscope music!
OUR RESEARCH

DISTILLED VERSION FOR PUBLIC

PUBLIC CULTURE

SCIENCE-INJECTED CULTURE

Educate

Excite

Science

Public
I need your help!

Set up displays in your depts. See cern.ch/ColliderScope to download some WAV files.

{Like, share, follow} x {Facebook, Instagram, Twitter, YouTube}

Reach out if you want some physics-themed music at your next outreach event or want to throw party w/ science at its core
I "opened for" the Roots!

Thanks for your attention!
I’ve made another for CMS which I’d like to show you now.
I made heavy use of:

- Blender
- OsciStudio
- Ableton Live
- Oscilloscope!
- PrettyScope
- Max
- TouchDesigner