

# Sonata in LHCb: The sound of antimatter (w/ Video)

August 27 2013, by Cian O'lunaigh

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In a recent paper the LHCb collaboration at CERN observed two particles changing from matter into antimatter and back again. Now the collaboration has turned that data into sound, so that you can listen to the music of antimatter.

For every [fundamental particle](#), there is a corresponding antiparticle. Antimatter particles share the same mass as their matter counterparts, but qualities such as electric charge are opposite. Though most particles exist as either matter or antimatter, some particles can switch between the two.

$B^0$  and  $B_s^0$  are such particles. They oscillate between their [matter and antimatter](#) equivalents up to 3 million million times per second. If that frequency were converted directly into the pitch of a musical note, it would be much too high for the [human ear](#) to hear. So the LHCb collaboration has slowed down the frequency millions of times so that we can enjoy the oscillation as detectable sound.

In the video below, a blue box moves from left to right across the screen, depicting the area of the graph you can hear. At first you hear only white noise – random background fluctuations of particles in the LHCb detector. But the two peaks on the graph come from the  $B^0$  and  $B_s^0$  particles. First you hear the loud tone of  $B^0 - B^0$  oscillations, then background noise followed by the tone of the  $B_s^0 - B_s^0$  oscillations. The higher frequency  $B_s^0 - B_s^0$  oscillations are experimentally more difficult to observe, which is why their tone is not as loud.

So sit back, relax, and enjoy the music of particles switching to antimatter and back millions of times per second.

Now that's vibrato.

Check out this explanation video of the data [sonification](#) from LHCb:

**More information:** Read the [technical paper](#).

Provided by CERN

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