

### Offered Title: Is There Sound in Space?

No. Next question.

My terse answer, while accurate, is not the whole story.

Sound energy is initiated by a vibration such as vocal cords, drums, tree falling in the woods...anything that vibrates can initiate sound. When something vibrates it compresses the medium (such as air, water, wood, metal, etc.) with its oscillations. While the frequency might be modified due to the medium, the medium becomes a carrier of this frequency. Waves caused by dropping a stone in water can serve as a visual demonstration. The stone causes a vibration frequency and the water gets compressed and becomes the carrier of this frequency. Sound that cannot move without a carrier medium, does not exist. The vibration exists but not sound.

Here's the kicker. Space is not a perfect vacuum, but close. There are scattered molecules available to act as a tenuous carrier. But there's a catch. The only sound frequencies that can be carried in this near vacuum are extremely low. We don't know the highest sound frequency carried in space, but we do know it is well below the human hearing threshold of around 20 oscillations per second. Final verdict, sound within human hearing capability cannot move in space.

The question "if a tree falls in the forest and no one hears it, does it make a sound?" is metaphysical. The word sound is defined as "that which is or can be heard". The presence of an eardrum is not required for sound waves to exist. The waves can be heard however if an eardrum is present.

So, if a tree were to fall, let's say on the Moon, and there was someone there to hear it, would it make a sound?

Let's look at the rest of the story of sound in space because reports are out there. Even NASA has jumped on the "sounds of space" bandwagon. Of course, they do explain how these "sounds" are heard.

A report from Apollo 10 astronauts carried some authority. They reported hearing what sounded like weird music while going around the far side of the Moon. Spooky. The "music" was coming from speakers though, not from outside the craft. This sound was found to be caused by radio interference.

NASA has recorded "sounds" made by sources within our solar system, and from far – far away. Most are from electromagnetic sources such as plasma, radio, magnetic field effects, ionized particle radiation. After processing by NASA, they sound weird, but they aren't sound waves. NASA takes the electromagnetic wave pattern and links it to sound. The coolest for me is the "sound" of a gravitational wave made by black holes merging. This "sound" caught by the LIGO instruments was due to a ripple in space itself. Is it actually sound?

### What's in the Sky?

February 9; pre-dawn; southeast: Jupiter, Venus, and Saturn are lined up above the horizon.