Our conventional SETI endeavors have focused on detecting artificial signs with communication techniques that are in everyday use in our present state of technical culture. These include the use of electromagnetic waves, i.e. radio, laser, and visible light communication techniques. What would be the most extreme (on a planetary scale) ways of showing one’s existence over the vast distances and hiding structures (i.e. interstellar clouds, star clusters etc.)? Could ETI use e.g. neutrino transmission, or high energy peaks to overcome the difficulties the conventional techniques have? This is a short review of some of the extreme, but feasible channels that could be incorporate into SETI from advanced particle and astrophysics.

**High Energy Peaks**

High energy peaks are e.g. bundle of accelerated atomic nuclei, such as gamma rays. Accelerating lot of signal nuclei would require lot of energy and would need to be somewhat targeted to receiver's direction. These energy peaks could be easily detected from space, but are filtered by the atmosphere.

**Neutrino Transmission**

Neutrinos are ideal for communicating over long distances and through hiding strictures. But it also make them extremely difficult to detect. Existing, very large neutrino detectors (e.g. Super-Kamiokande) could already be used to make statistic analysis about neutrino sources. Neutrinos can be produced in e.g. nuclear reactors.

**Artificial Illumination**

Future exoplanet telescopes could observe exoplanets directly. Detecting phase modulations produced by very strong artificial illumination on the night side of the planet could reveal technological civilization.

**Fast Radio Bursts**

Fast radio burst (FRB) is a high-energy astrophysical phenomenon of unknown origin manifested as a transient radio pulse lasting only a few milliseconds (Wikipedia). We have detected over 20 FRBs in the past 15 years. It has been proposed that these bursts are artificial.

**Artificial Transits**

Just for saying ‘Hello!' by sending a very large, but lightweight object in to solar orbit would not be so difficult. Such a thin, lightweight structure would act like solar sail, and would have to move time to time perpendicularly to solar wind. However, it could easier to just distort the apparent shape of transit light curve with controlled laser emission (Fig. 5).

**Hypothetical Ways**

More extreme ways of saying ‘Hello!’ could include using CMB (around 279.5 GHz), gravitational waves, or even highly hypothetical faster than light communication, i.e. quantum entanglement or tachyons. These are some examples of hypothetical channels that could be incorporate into SETI if feasible detection becomes available.

**Conclusions**

There are many ways of showing one’s existence over the vast distances and hiding structures in the Universe. It seems that only our imagination and instrument sensitivty are the only limitation for finding new channels for detecting potential artificial signals or technosignatures.

**Further Readings**