CHANG YUNG-TA
ECHOES OF SILENCE

TECHNICAL & SCIENTIFIC CONCEPTS

References are listed in order of appearance throughout the works. ↓

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to know more ↓

WITHOUT COMPOSING_N°5

WITHOUT COMPOSING_N°1 [VER.2]

SCAPE.UNSEEN-MODEL T [VER. 1.2]

SCAPE.UNSEEN-SAMPLE T

SEEN/UNSEEN-ENTROPY N°2

SEEN/UNSEEN-ENTROPY N°1

YPHENOMENON
(QUADROPHONIC VERSION)

WITHOUT COMPOSING_N°5

RADIOACTIVITY

Radioactivity is a natural physical phenomenon. Some atoms are considered stable because they do not change. Others, unstable, have an excess of energy that causes them to spontaneously transform — this is called decay. As they transform, they release their energy in the form of radiation that is invisible to the naked eye. This phenomenon is known as radioactivity.

There are several types of radiation:

→ **Alpha radiation (α)**
Made up of heavy particles, it is not very penetrating and can be stopped by a simple sheet of paper or by skin.

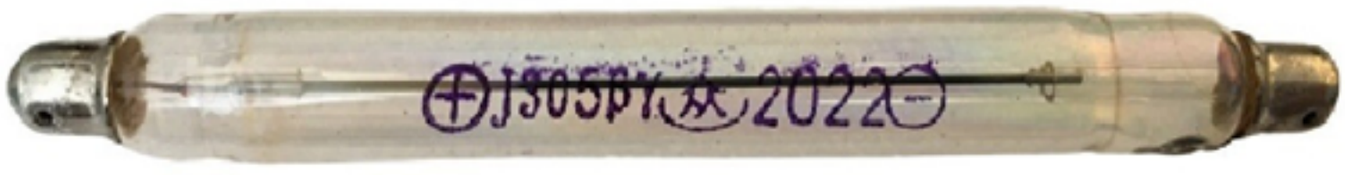
→ **Beta radiation (β)**
Composed of lighter particles, it can pass through skin but is stopped by materials such as aluminum.

→ **Gamma radiation (γ)**
An electromagnetic wave that is highly penetrating, it requires dense materials like lead or concrete to be blocked.

GEIGER-MÜLLER TUBES

The Geiger-Müller tube is a sensor used to detect radioactive radiation. It contains a gas that reacts when radiation enters it, producing an electrical signal. This signal can then be used to count or measure the presence of radioactive radiation.

GEIGER-MÜLLER COUNTERS



The Geiger-Müller counter is a complete device used to detect and measure radioactive radiation. It includes a Geiger-Müller tube, an electronic system to process the signals, and a screen or speaker to display or hear the detections.

ALL OF THE ARTWORKS →

WITHOUT COMPOSING_N°1 [VER.2]

FUKUSHIMA NUCLEAR DISASTER

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On March 11, 2011, an underwater earthquake triggered a massive wave (tsunami) that struck the northeastern coast of Japan. The water severely damaged the Fukushima nuclear power plant, leading to the release of radioactive waste into the ocean. This event is considered the most serious nuclear accident since the Chernobyl disaster in Ukraine in 1986.

COSMIC RADIATION

Cosmic radiation is a type of natural radiation that comes from space. It is made up of highly energetic particles, mainly protons, that travel through the universe at very high speeds. These particles originate from the Sun, as well as from distant stars or stellar explosions (such as supernovae). When they reach the Earth's vicinity, they collide with the atmosphere and create other particles, some of which can reach the ground. The Earth's atmosphere plays a crucial protective role by absorbing a large portion of this radiation.

ALL OF THE ARTWORKS →

SCAPE.UNSEEN–MODEL T [VER. 1.2]
SCAPE.UNSEEN–SAMPLE T

LIWU RIVER, TAROKO GORGE

© Lienyuan Lee

The Liwu River is located in northeastern Taiwan. It runs through an exceptional natural site, the Taroko Gorge, known for the spectacular erosion that has carved vertical rock walls. Heavy rainfall can occasionally increase the river's flow, which has shaped the cliffs—despite them being largely made of marble, a material known for its resistance. The site is regularly studied by geologists, particularly to better understand the formation of landscapes.

ALL OF THE ARTWORKS →

SEEN/UNSEEN-ENTROPY N°2

DRY ICE

Dry ice is solid carbon dioxide (CO_2), which forms at a temperature of around -78.5°C (-109.3°F). Unlike water ice, it doesn't melt but instead turns directly into gas through a process called sublimation. This unique property makes it ideal for creating special effects such as dense fog, commonly used in films or theater productions.

RADIATION TRACKS

In a cloud chamber, different types of radiation can be identified by the shape and length of the tracks they leave behind. Alpha radiation produces short, thick tracks due to its strong interaction with matter. Beta radiation creates longer, thinner tracks because it interacts less intensely. Finally, gamma radiation, being an electromagnetic wave, usually does not leave a direct track, but it can cause visible secondary effects, such as electrons being emitted during interactions with other materials.

ALL OF THE ARTWORKS →

SEEN/UNSEEN-ENTROPY Nº1

RADIOACTIVITY OF ROCKS

The Earth’s crust naturally contains radioactive elements such as uranium, thorium, and potassium. These elements are found in various rocks and minerals, primarily in granitic rocks and certain volcanic rocks. Their radioactive emissions are low but constant, contributing to the natural background radiation on Earth. At normal exposure levels, the radioactivity of the Earth’s crust is generally not considered dangerous.

DATING TECHNIQUE

Various dating techniques make it possible to determine the age of a material with varying degrees of precision. Radiometric dating (also known as radioactive dating or radiochronology) is based on measuring the decay of atoms — a regular process that varies depending on the material. When the rate of decay is known, it is enough to measure the remaining amount of radioactive elements to calculate the time elapsed since the beginning of the process, thereby estimating the age of the sample.

TRANSDUCERS

A transducer is a device that converts one form of energy into another. For example, a microphone transforms sound (acoustic energy) into an electrical signal, and an electronic thermometer converts heat into an electrical signal to measure temperature. In this context, the signals from the electronic system are converted into vibrations. The transducers used here are known as piezoelectric transducers. They use a material that mechanically vibrates when an electric current is applied. These vibrations can produce sound (as in a buzzer or miniature speaker) or tactile vibrations (as in phone vibration motors).

ALL OF THE ARTWORKS →

YPHENOMENON (QUADROPHONIC VERSION)

DIGITAL MODULATION TECHNIQUES

Digital modulation techniques are used to encode and transmit digital data (0s and 1s) in the form of electrical, radio, or optical signals. In this case, the artist transforms sound data into visual signals. Each sound segment becomes a point of light, and the frequency of the sounds determines the movement of these points.

ALL OF THE ARTWORKS →