ENHANCEMENT, EXTRACTION & SEPARATION TECHNOLOGY

By Using Ultrasound and High Powered Waves

QUANTUM APPLICATIONS

97/5, "KRISHNA KUNJ"
SHIVAJI PARK, RANADE ROAD,
DADAR
MUMBAI 400 028
EMAIL: niranjanbilgi@yahoo.com ;
quantumapplications@ymail.com
CELL #: +91 9699165381

Basics Of Power Ultrasonics

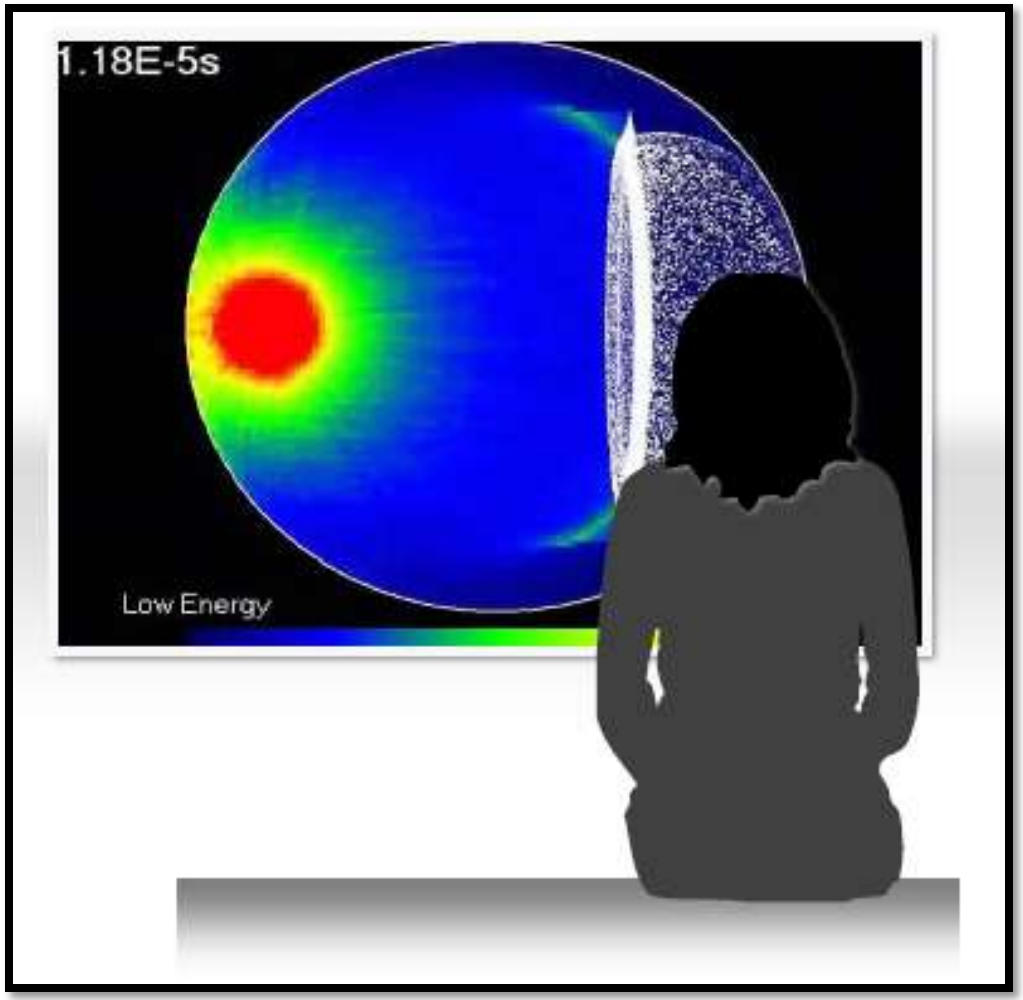
- Sound waves are mechanical vibrations in solid or fluid.
- Whenever the oscillations of a sound source occur inaudibly fast we talk of ultrasound.
  - Infra sound range < 20 Hz
  - Audible sound range 20 Hz -20'000 Hz = 20 kHz
  - Ultra sound range 20 kHz -1'000 MHz = 1 GHz
  - Hyper sound range > 1 GHz
  - Industrial ultrasonic applications 20 -150 kHz
  - Medical diagnostics, therapy and non destructive material testing1 -15 MHz
- Ultrasound can be divided into two broad categories: low- and high-power ultrasound.
- Low power applications include medical imaging and non-destructive testing
- By contrast high power applications include extraction and separations of liquids- liquids, etc

Basics Of Power Ultrasonics

- High power applications use lower frequencies between 20 kHz to about 100 kHz since power available is limited by mechanical stress in the vibrating parts.
- Conversely higher frequencies are used in measuring applications because the shorter wavelength offers greater accuracy, and at low power - mechanical stress is not a problem.
- Typical amplitudes range from about 5 to 50 microns (that's 0.005 to 0.05 mm, or 0.0002 to 0.002 inches)
- Think about this: ***An ultrasonic system operating at 20 kHz and 50 microns is moving with a cyclic acceleration of 80,000 g (eighty-thousand times the force of gravity).*** ***Can anything else on earth match that?***

Ultrasound Energy Induces Cavitations in the Medium...

Energy conditions are like on the sun's surface - for best stimulation results



Cavitation – A Fundamental Aspect

- The bubbles exist only when the pressure is low - they are extremely unstable when the pressure is high resulting in violent collapse thus momentarily creating immense temperatures and pressures.

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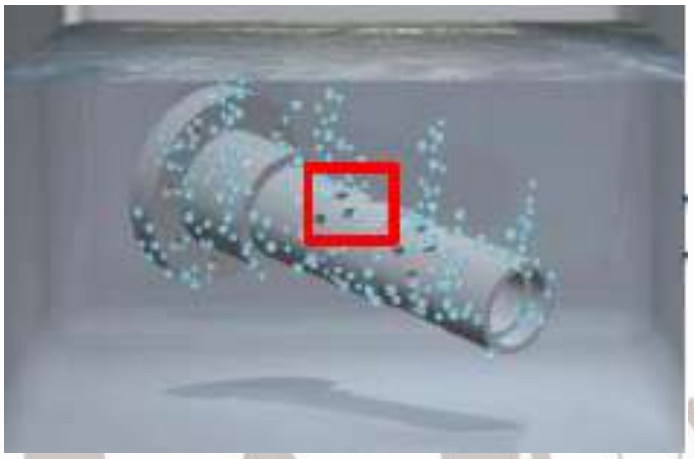
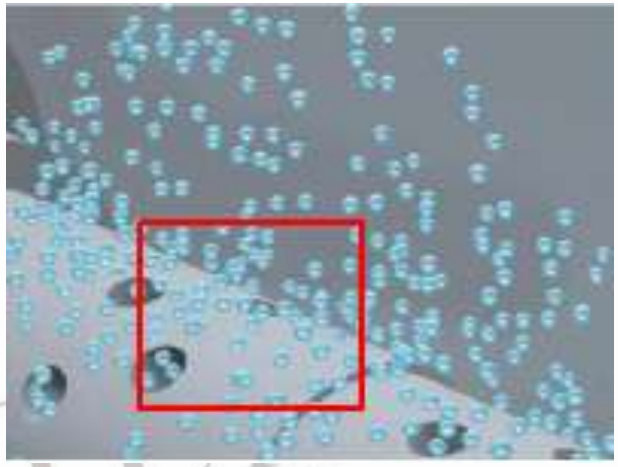
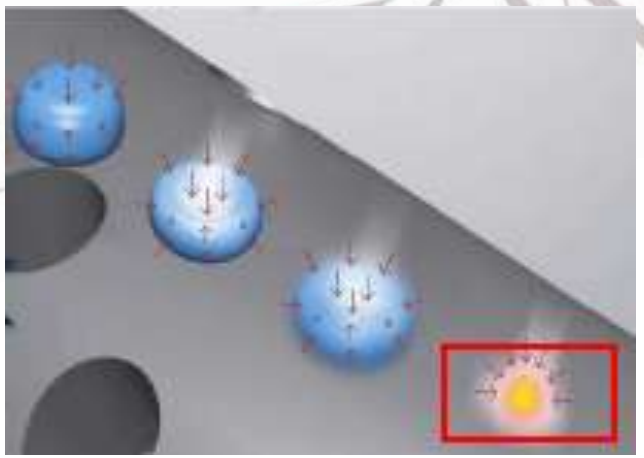
- In a strong uniform ultrasonic field, millions of bubbles throughout the liquid will be formed and destroyed thousands of times per second, thus affecting the bulk properties of the liquid.

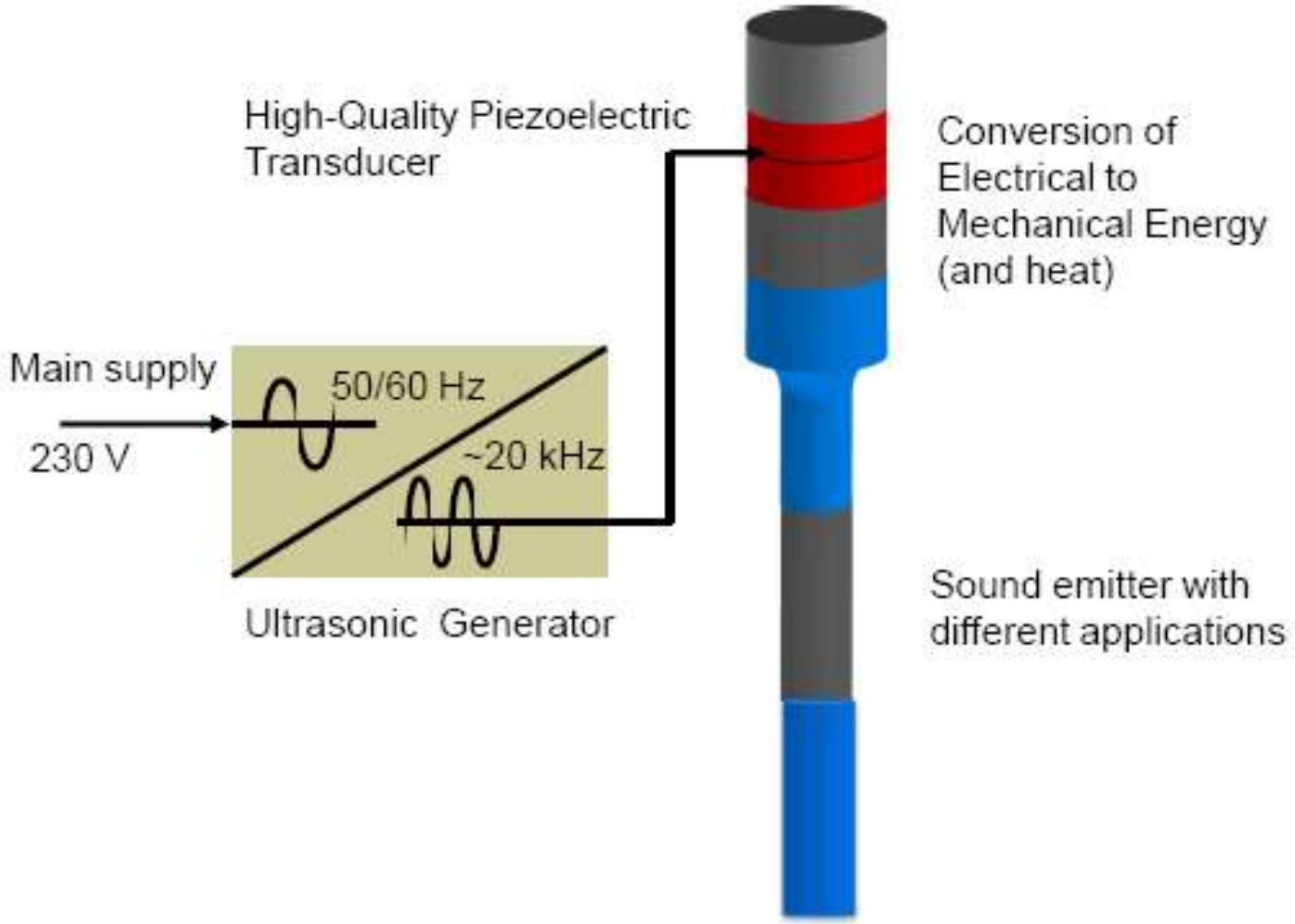
Cavitation – A Fundamental Aspect





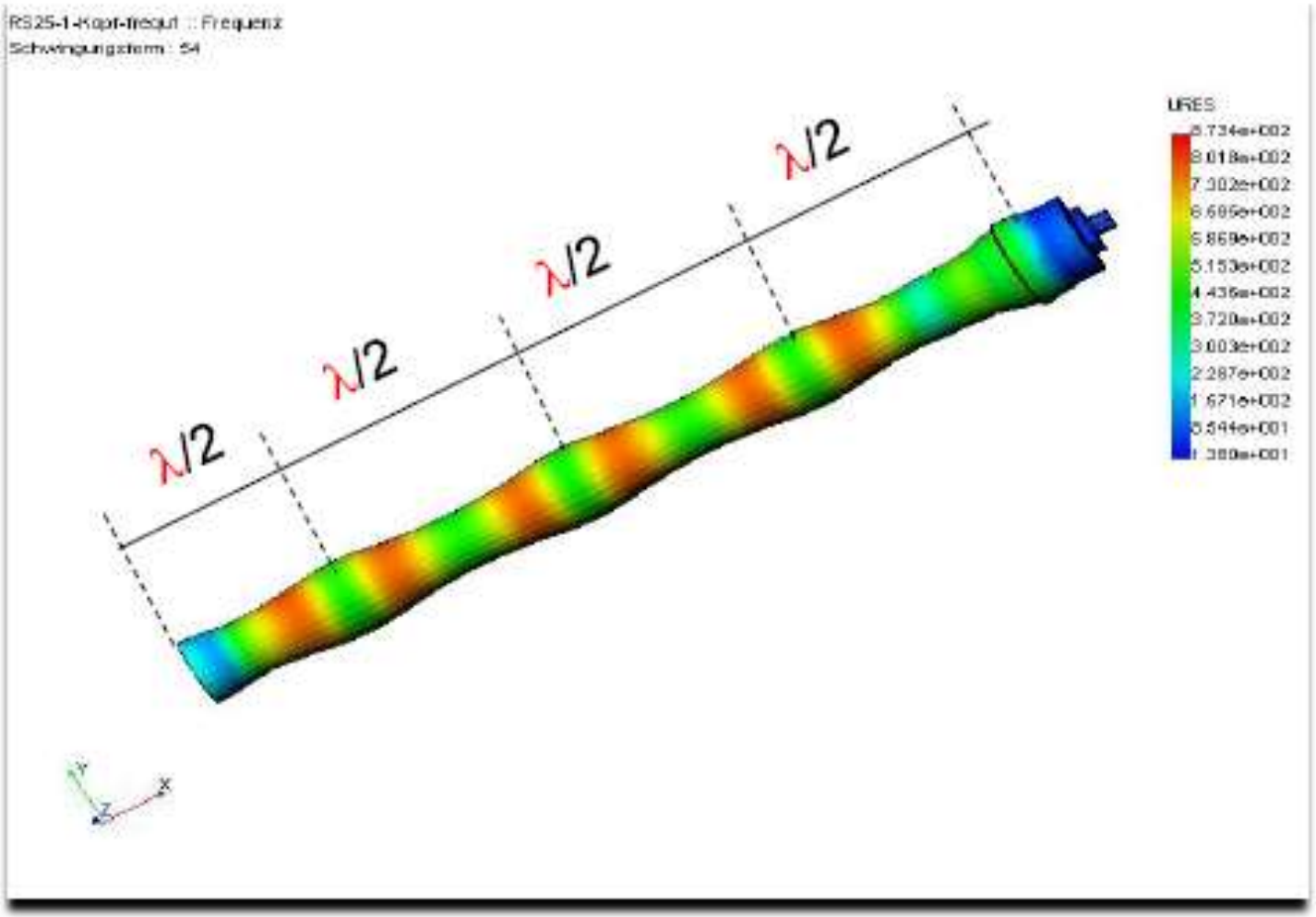


How Is Ultra Sound Wave Generated?



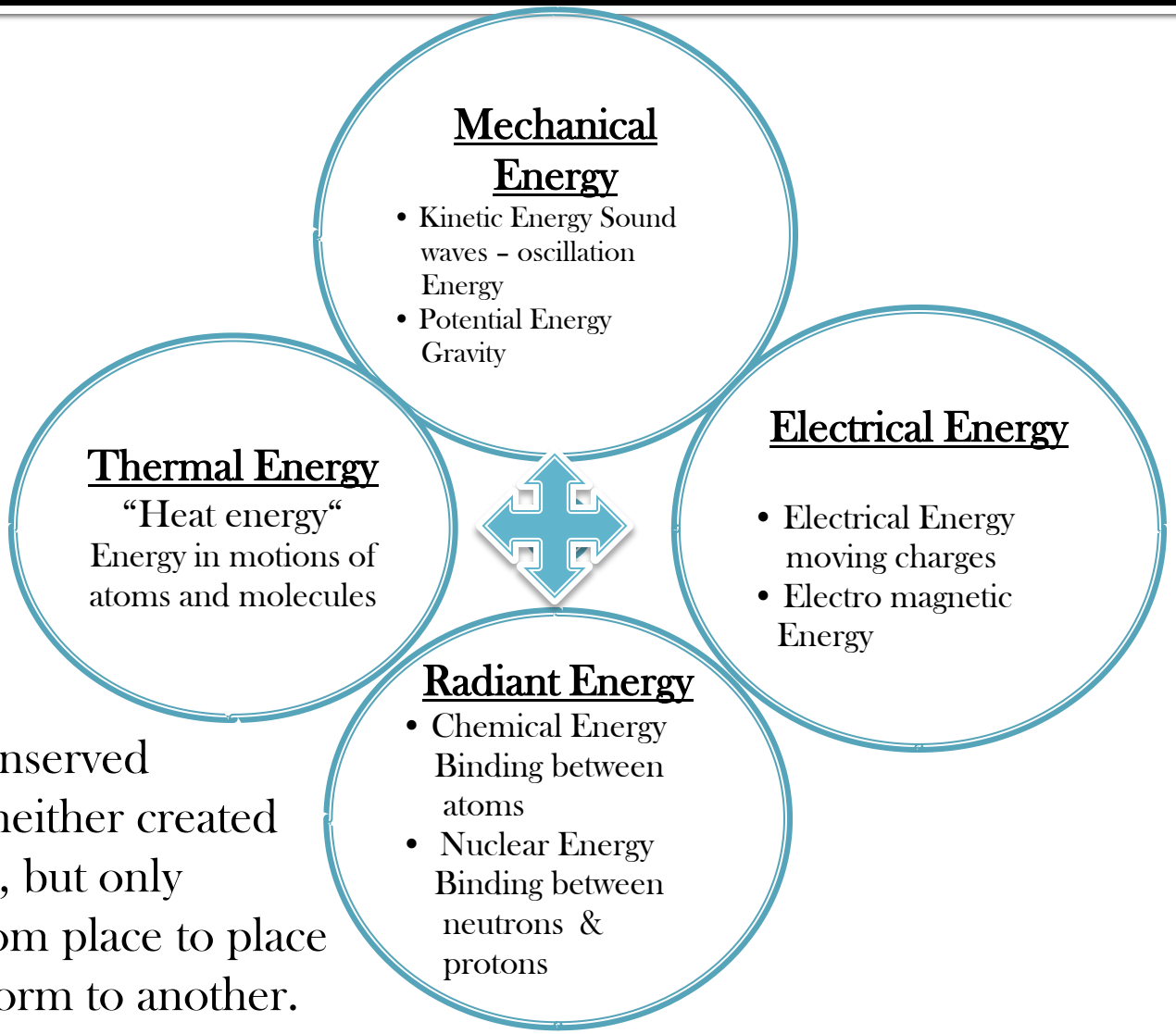
Special Sound Resonators

Radiating Surface On The Tube Resonator



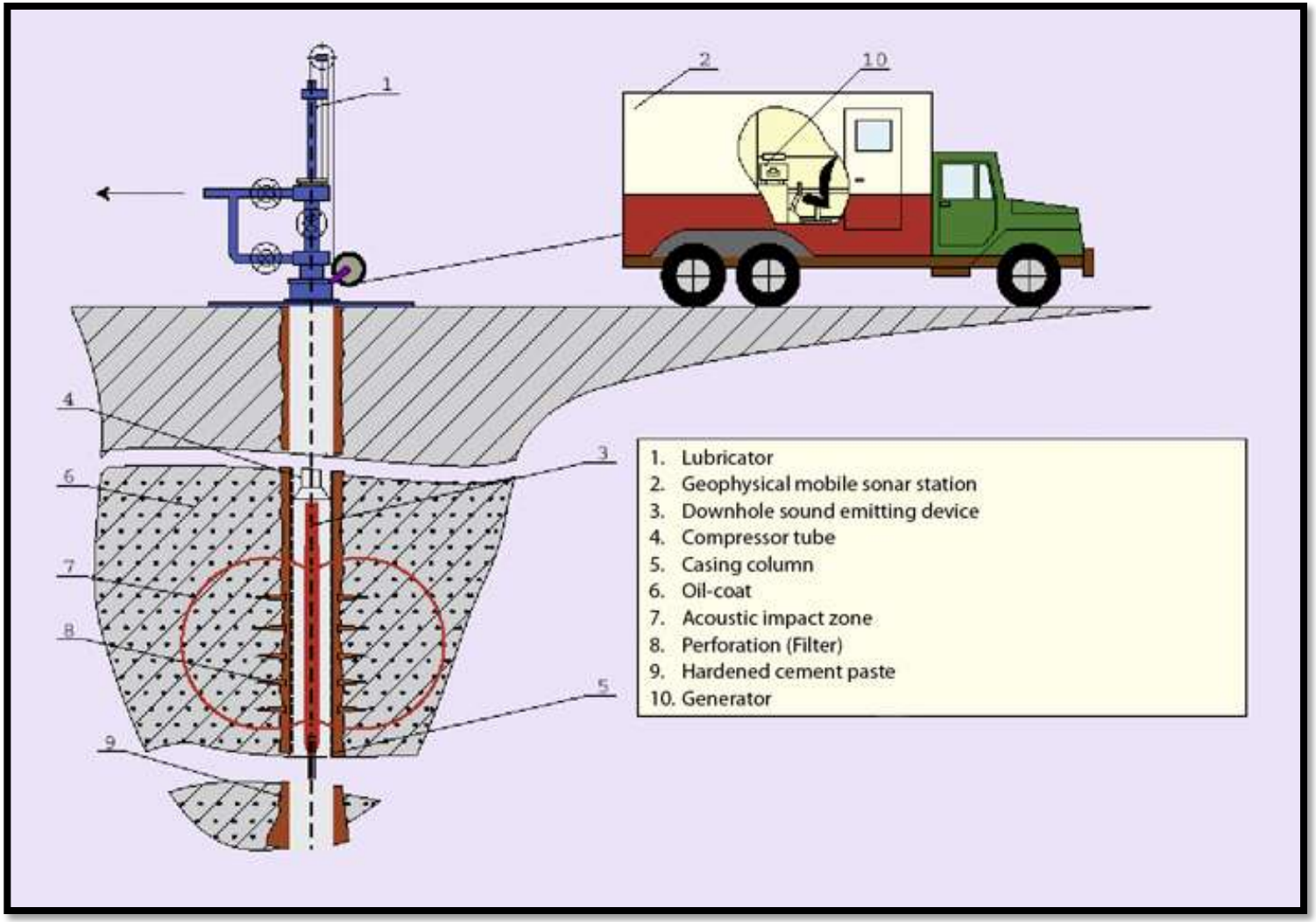
Power rating for resonation depends on the length of the resonator

Ultra Sound Energy Reflects In 4 Forms

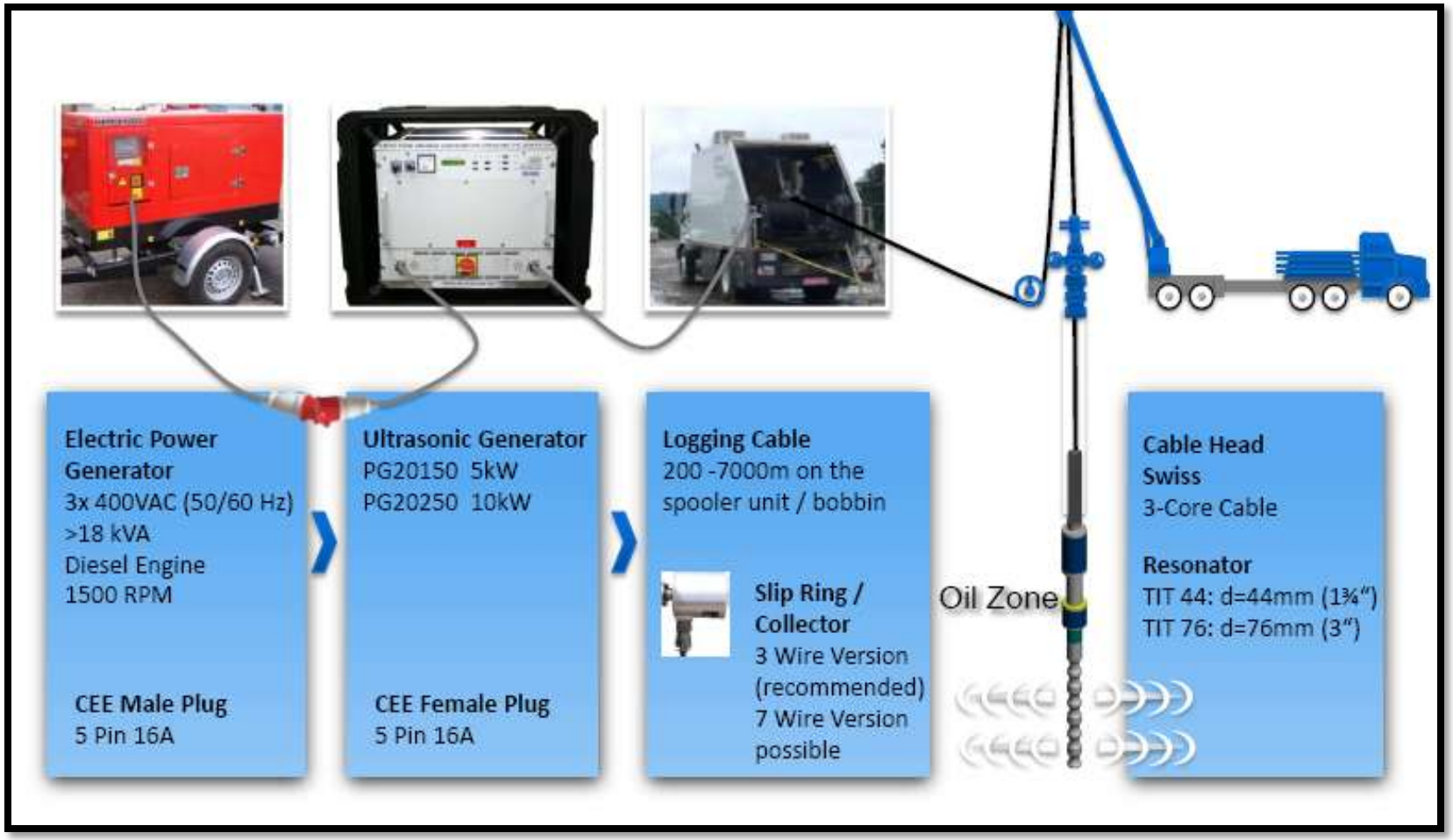


Energy is a conserved quantity: it is neither created nor destroyed, but only transferred from place to place or from one form to another.

Primary Schematics of Meeting the Objectives



An Easy Setup-System Overview



Effects of High Powered Ultra Sound on Porel Space and Permeability

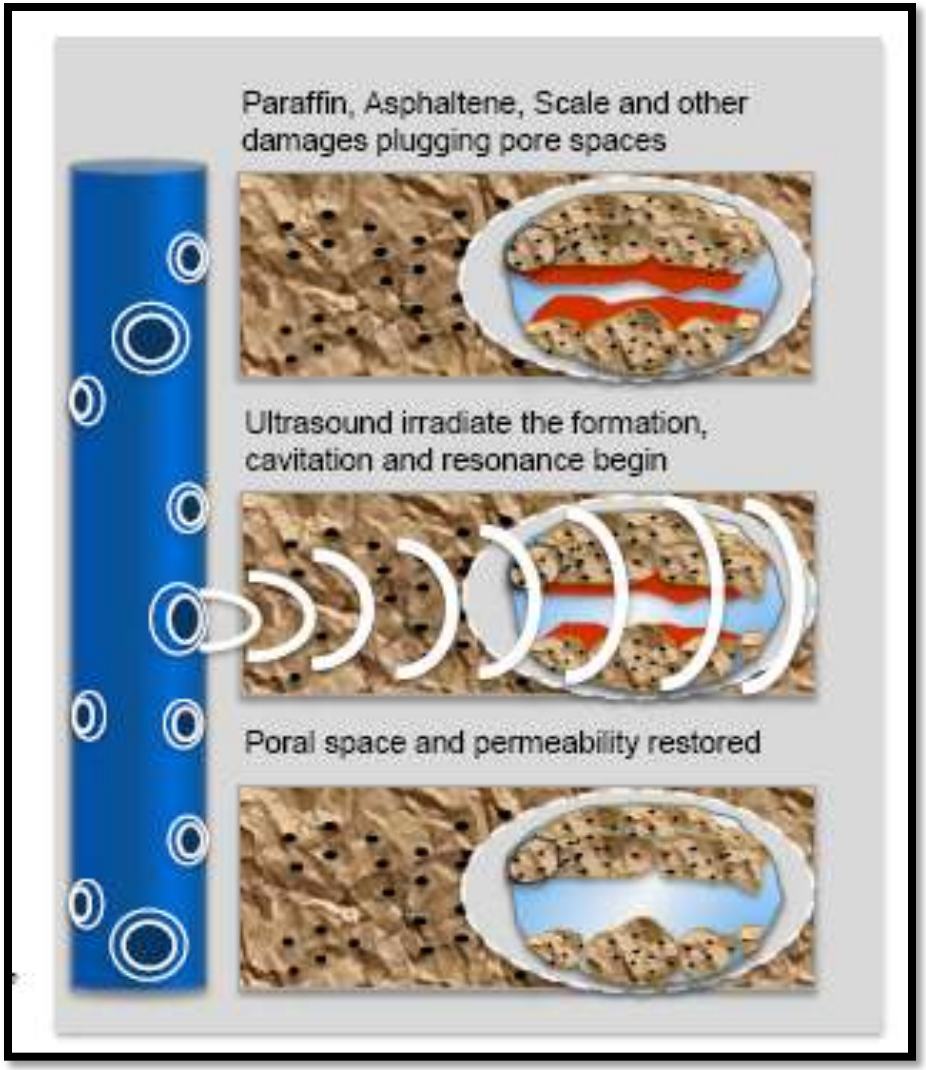
Different damages - plugging pore spaces.

- Waves of compression cyclically load the porosity of the rocks repeatedly and transform the waves of pressure-stretching to creating conditions for the development of a network of cracks and micro cracks, both in walls of punched channels, and in layers adjoining them.

Resultant:

- Increase in the permeability of the rock owing to changes in the structure of the porous space.
- Removal of mineral salt deposits in the capillaries.
- Decrease in viscosity of oil.
- Efficient restoration of productive formation with minimal down time of well.
- Minimum resources inputs and without oil reservoir damages.

Porel Space and Permeability

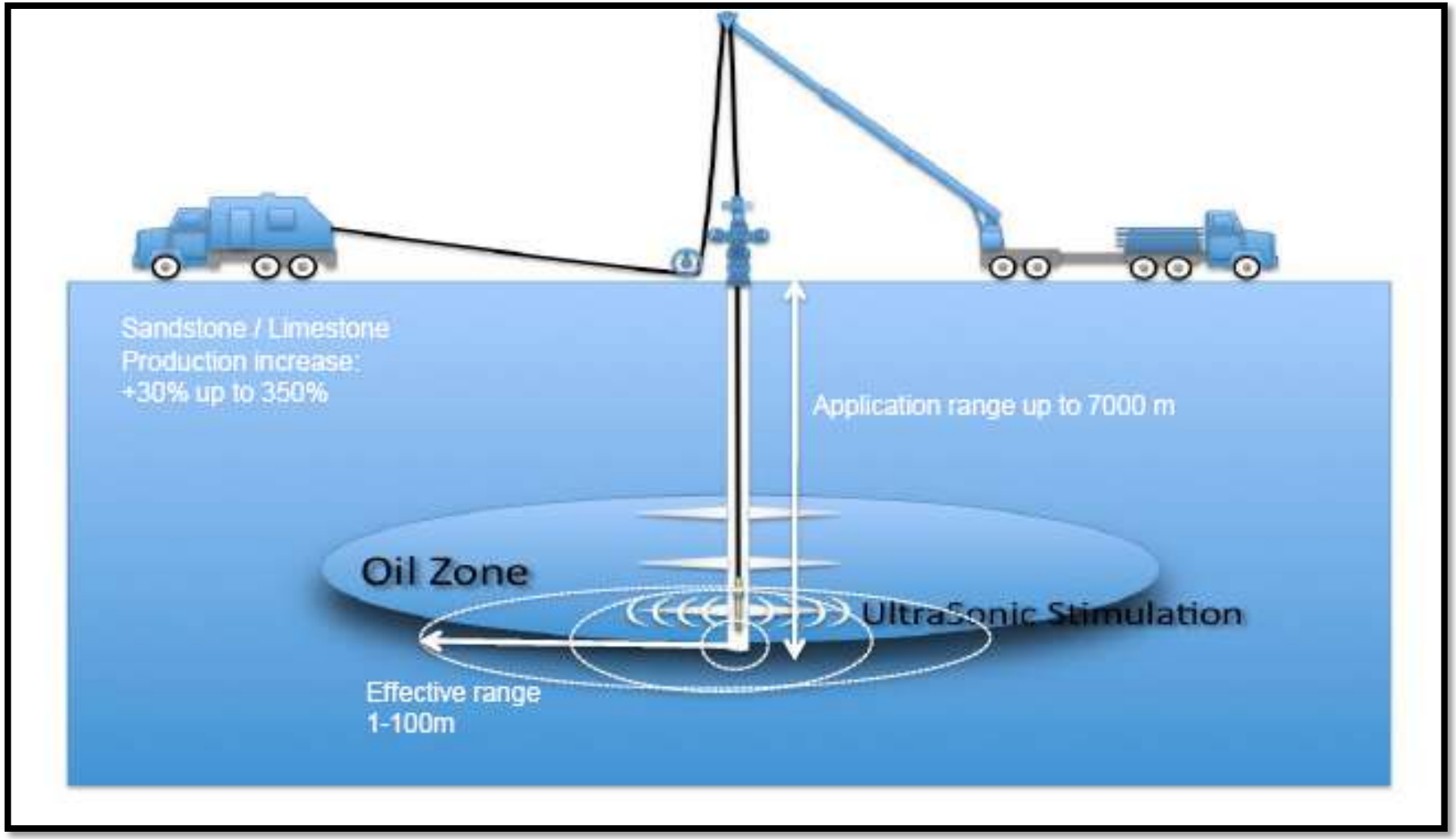


Borehole Effects

By the use of Ultrasound vibrations one can:

- Remove wax & asphaltene deposits
- Destroy salt formation in the capillaries
- Reduce surface tension in capillaries
- Destroy colloid formations
- Clear the capillaries of the close zones to the layer
- Decrease in viscosity of oil
- Decontaminate
- Increase of API
- Unclog injected particles
- Crack up of particle bridge structure

Schematics of Ultra Sound Stimulation



What We Provide

We provide lowest level of risk in oil & gas investments and producing properties, with levels of returns that they will only achieve through pure exploration projects.

Our Technology Sets Us Apart.

THANK YOU FOR YOUR TIME and ATTENTION!