



## Third Laureate Applied Research



**Project Title:** Design and manufacturing of magneto-striction  
ultrasonic head (high-power)

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### Abstract:

Ultrasonic waves are acousto-mechanical vibrations with frequencies of 20 KHz to 10's of MHz. These waves have a very wide range of applications in manufacturing industries, medical areas, agriculture, archeology, geology, communications, non destructive testing and generation of inner-body 3D-image of a bulk.

The heart of ultrasonic systems is the transducer which is driven by an alternative power supply. The amplitude of vibrations can range from 1nm to 100  $\mu$ m. Although the amplitude seems very small but the acceleration can reach to 200,000 times of the gravitational acceleration. The power can range from microwatt to 10's of kilowatts.

The aim of the present project was the innovation, design and manufacture of ultrasonic transducers by employing magneto-strictive and electro-strictive effects along with design and manufacture of concentrators and expanders. Totally twenty eight papers have been extracted from the works among which eighteen articles have been published in international Journals and nine papers for national and international conferences. The outcomes of the activities have been the commercialization of various transducers for research and development for different research institutes and laboratories and also ultrasonic cleaning systems including a number of ultrasonic washing lines which have been sold to different countries.