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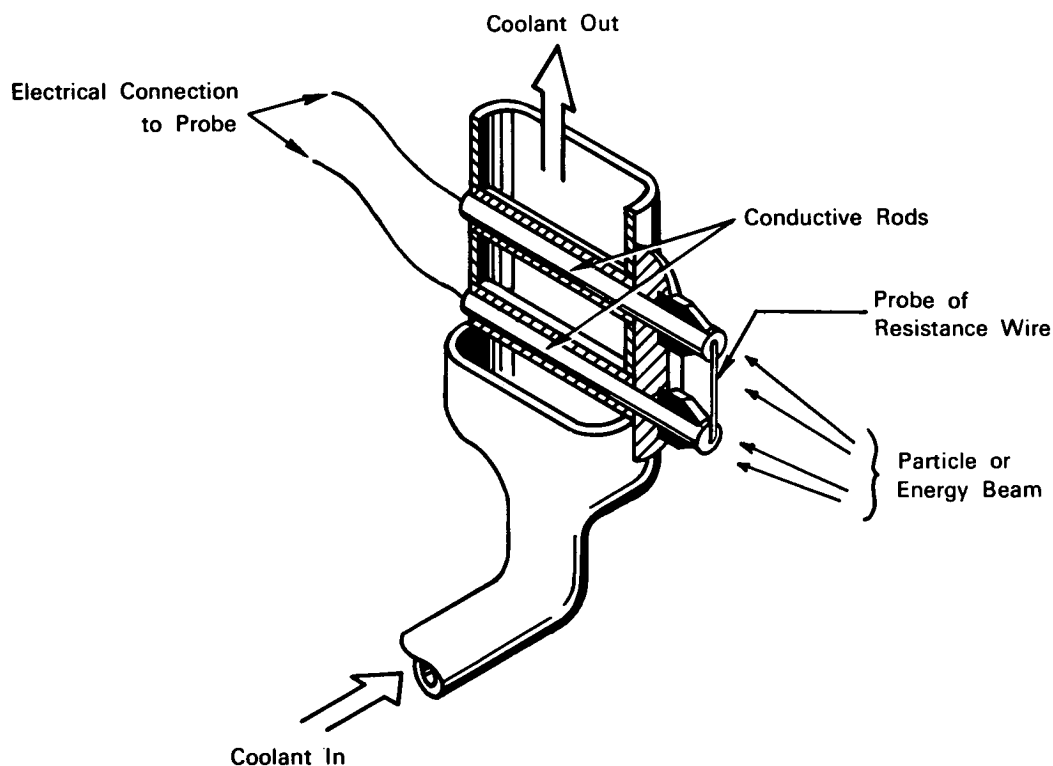
Brief 63-10344

# NASA TECH BRIEF



This NASA Tech Brief is issued by the Technology Utilization Division to acquaint industry with the technical content of an innovation derived from the NASA space program.

## Cooling Method Prolongs Life of Hot-Wire Transducer



**The problem:** One method of measuring the power density of a particle beam, such as from the exhaust of an ion rocket engine, involves the use of a probe (a hot-wire transducer) consisting of very-small-diameter resistance wire, which changes resistance as a function of temperature. The heat developed in the wire probe by the intercepted portion of the energy beam may raise the temperature of the wire above its fusing point and thereby destroy it.

**The solution:** An arrangement for cooling the wire probe.

**How it's done:** The two ends of the wire are supported on thermally and electrically conductive rods which are surrounded by a fluid cooling medium. In this way the supporting rods are kept at a substantially constant temperature and prevent the probe from overheating. The illustration schematically shows the

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apparatus with a coolant fluid circulating around the conductive rods.

**Notes:**

1. Instead of using a cooling fluid to control the temperature of the wire, the ends of the conductive supporting rods for the probe may be placed in intimate contact with metal blocks which serve as a heat sink.
2. The change in resistance of the wire probe due to its heating by an energy beam may be measured by a conventional constant-current circuit.

3. For further information about this innovation inquiries may be directed to:

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Reference: B63-10344

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Source: L. V. Baldwin and V. A. Sandborn  
(Lewis-41)