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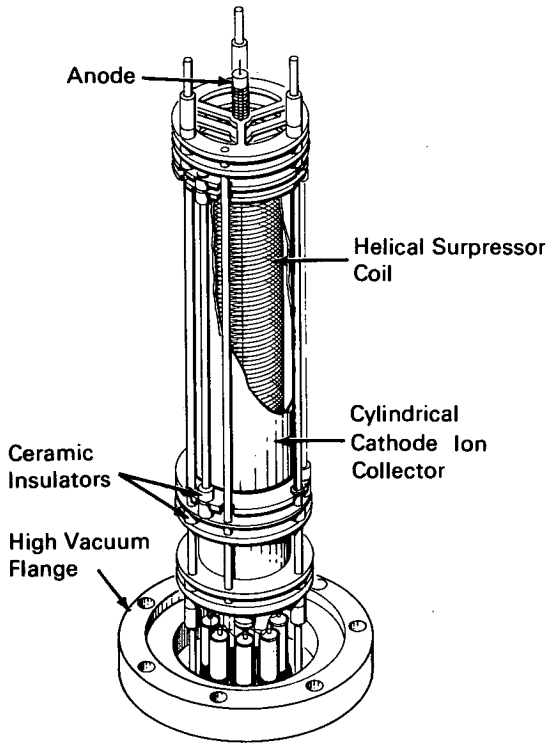
NASA TECH BRIEF

An Improved Orbitron Ionization Gage Measures Ultrahigh Vacuum

An Orbitron ionization gage with an improved signal-to-noise ratio has been developed to measure vacuum conditions in the range of 10^{-11} torr. The unique feature of this gage, shown in the figure, is



the addition of a 1 1/2-in. diam helical coil electrode which separates the 1 7/8-in. diam solid cathode ion collector from the volume where ionization of the gas molecules takes place. Ions which are generated within the volume are accelerated toward the helical electrode; however, the high transmission of the electrode for energetic ions enables most of them to pass through the coil and to be collected at the cathode. The amount of negative charge required to neutralize the ions can be related to the level of vacuum achieved.

The helical coil, maintained at a negative potential with respect to the ion collector, acts as a suppressor grid that reduces secondary emission from the collector. The secondary emission produces an undesirable background noise which degrades and limits the ultimate sensitivity of the gage. The presence of the helical coil also increases the lifetime of the electrons which ionize the residual gas molecules, thereby achieving the equivalent sensitivity with a reduced input current.

The simple design and relatively low cost of the gage make it attractive for commercial applications such as high vacuum coating operations, vacuum test chambers, and electron vacuum tube production.

Note:

The following documentation may be obtained from:

Clearinghouse for Federal Scientific and Technical Information
Springfield, Virginia 22151
Single document price $3.00
(or microfiche $0.65)

Reference:
NASA-CR-1300 (N69-28402), Study of New Orbitron and Ion Gauge Designs

(continued overleaf)

Patent status:

Inquiries about obtaining rights for the commercial use of this invention may be made to NASA, Code GP, Washington, D.C. 20546.

Source: C. M. Gosselin of
Midwest Research Institute
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