

Development of a Low-Cost, Low-Power, Miniature Sector Mass Spectrometer with IonCCD Detection

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Under the Intelligence Advanced Research Projects Activity (IARPA) Molecular Analyzer of Efficient Gas-phase Low-power INterrogation (MAEGLIN) program, Leidos developed technology for low cost chemical detection and identification using a compact magnetic sector mass spectrometer. This mass spectrometer incorporates several innovations for low-power, including a low power non-thermionic ionization system based on electron tunneling of field emitters, permanent magnet magnetic sector that does not use any power for mass separation, and an arrayed detector using an IonCCD for simultaneous detection of all ions. The short ion path length facilitates operation at higher pressures than typically required for a sector field instrument, further lowering power and improving fieldability. Because all ions are collected simultaneously on an arrayed detector, there is no loss of signal that would normally occur from a scanning or pulsed instrument, such as a conventional magnetic sector, electric/magnetic sector, time-of-flight, ion trap, or a quadrupole instrument. Our system underwent government testing and results of the final development and testing will be presented.

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