DEVELOPMENT OF A HIGH SENSITIVITY TRIPLE QUADRUPOLE INSTRUMENT FOR QUANTITATIVE ANALYSIS

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The purpose of this project was to improve the sensitivity of a turbopumped triple quadrupole by at least an order of magnitude. Examination of the ion transmission efficiencies in the atmospheric sampling and ion optic regions revealed several areas where improvements could be made. The end result of the work was that a number of incremental gains were achieved in various areas of the instrumental design which together yielded a significant overall improvement.

The areas where improvements in ion transmission efficiencies could be achieved were the following:

A. The ion sampling region – Improving the capture of ions coming from the atmospheric source in the free jet expansion of gas.
B. The ion transfer region – Improving the transmission of ions and removal of neutral gas from the free jet expansion into the analyser.
C. The collision cell –
   By improving the transport of ions into, through, and out of the cell
   By minimising the ion transit time through such a cell

The incremental gains implemented in the three areas discussed lead to overall gains. The range in improvements are due to compound and various degrees of improvements these elements provide on individual instruments.