Re: low noise amplifier for high impedance source

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> where the resistors are 1M, and the capacitors 20pF. The
> signal voltage developed across a low−value resistor like
> 1M will likely be much less than you like, as Phil implied.
> Resistor noise density is i_n = (4kT/R)^1/2, so you'll want
> a high R, like 100M or higher. The load capacitance will
> start reducing the signal (including the resistor noise)
> voltage above a frequency fc = 1 / 2pi R C, which is only
> 8kHz for 1M, and 80Hz for 100M. So clearly you want to
> lower value of the load C if you can.

As Comisarow discusses in that paper, above the fc you calculate the RC looks like a low pass filter and so attenuates the signal voltage as the cyclotron frequency rises. However, the current is proportional to cyclotron frequency and so these offset, giving constant signal voltage as the frequency (and thus the mass/charge ratio) varies. Not saying rising signal with decreasing m/z wouldn't be nice, it's just how it falls out. It is convenient that the proportionality between number of ions of a given m/z and the signal voltage is constant, and not a function of m/z (assuming constant cyclotron radius).

What kind of Penning trap system are you working on, Arch?

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Regards,
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