kilogram have been pursued by D. Pritchard's group at MIT as well as by R. S. Van Dyck Jr. at Washington and sub-ppb accuracies have been achieved [30].

It would be far beyond the scope of this note to even describe these experiments in a general sense, especially where all the examples mentioned are being addressed at this symposium and the reader is referred to the references given as well as to the articles by the individual groups in these proceedings.

5. The "Branches"

Precision spectroscopy being the "trunk" of our tree, i.e. the back bone of the field of ion trapping, many new areas have been developed over the years using only part of the ultimate goals defined in the introduction. These I compare to the branches of our fractal tree, being intimately connected to the main trunk and carrying all the resemblance of a genetic heritage in them. Examples helping to define this, but which I will not discuss in any detail in this article since these will be reported on individually, are for instance the mass spectrometry of short lived isotopes [31], where the confinement techniques are used to enhance the sensitivity but the line width is determined by the internal life time of the system rather than by the storage time or the determination of the life times of metastable states [32]. Instead I want to discuss two branches in which I am personally interested and somewhat involved, the injection of external particles into traps and the studies of non-neutral plasmas, especially a technical application attempting to achieve actual power out-put through fusion.

5.1. Injection of Particles from External Sources.

In his early paper E. Fischer [6] made the very strong statement *"...es ist unmoeglich, ein Ion von aussen in das Feld einlaufen zu lassen, - was auch ohne Rechnung verstaendlich ist, - das Ion darf erst im Raum zwischen den Elektroden aus einem neutralen Molekül gebildet werden."* (...it is impossible to introduce an ion from outside the field, - which can be understood even without calculations -, the ion must be produced in the space between the electrodes from a neutral molecule). We know very well today, that the "violation" of this law has brought us a large variety of exciting physics opportunities, amongst which we find positron physics, antiproton trapping and spectroscopy, studies of rare isotopes, retrapping of highly charged ions from the EBIT, and many more.

In the paper by H. Schnatz et al. it is stated that *"all ions studied so far in an ion trap were produced inside the harmonic well of the ion trap"* [33]. In the most