

Introductory Comments

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It is my understanding that the topic of radio-frequency systems includes dees, liners and resonant lines, coupling methods, oscillators, methods of getting variable frequency, and so on. My personal connection with radio frequency is rather more that of a customer than anything else. So as a customer I would like to put down some of the things that I think we customers would like to see in r-f systems.

Perhaps one of the most important is stability, and this would include stability against parasitics, ease of starting, and frequency stability under varying load conditions. That is, if the load varies the frequency should remain reasonably constant.

Another important criterion is the efficiency; it is perhaps not so much that we want to save money on power, but to save wear and tear on the cyclotron itself. If we have too much power involved, it can cause a lot of damage. We would like to have low losses and a low input power for the required dee voltage.

The voltage distribution on the dees is also important. We still call them dees, although they may not look much like dees any more. In particular the place where we would probably like to have reasonably high voltage is the center, to get the ions out as rapidly as possible, and possibly at the edge to get an increment of radius as large as possible at the edge. So we would like to have, if possible, no voltage droop at the center or edge, or at least as small a droop as possible.

Variable frequency requirements will vary from machine to machine, depending upon whether just one type of ion is to be accelerated, or whether quite a variety of ions, protons, alpha particles, carbon ions, and so on, are to be accelerated. We would want to have the variable frequency feature in such a machine easy to adjust and to have as few blind spots as possible in the spectrum. I think that is a preliminary set of criteria from which we can judge the papers that are to follow.