

A New Structure of Linear Accelerator, Y. ZHAO,
BNL - A new scheme is proposed for the collider cooling RF, on which the cavity is almost a pure pill-box. The principle is to divide the accelerating cells into three separate channels with a phase difference of $2\pi/3$ between each other. A special structure is designed that each channel is like a side-coupling cavity structure operating at $\pi/2$ -mode, but an extra phase shift of π is introduced so that the phase difference between two accelerating cells is 2π . Therefore, the beam sees a $2\pi/3$ -mode implying a high interaction between cavity and beam, while the RF system sees a $\pi/2$ -mode implying a high stability. In other words it combines the advantages of both traveling wave and standing wave. The mechanical structure is also simple and compact because the side coupling cavity is formed by a uniform rectangular-like waveguide, which is simply an arc section attached on the main cavities. The principle and the preliminary simulation are addressed in detail. This principle is also applicable for a $2\pi/4$ -mode and other machine provided the coupling due to apertures is weak enough.