3.xx Linear Accelerator Structure

```
label: LCAVITY, TYPE=name, L=real, DELTAE=real, PHI0=real, FREQ=real,&
       ELOSS=real, APERTURE=real, E0=real, VOLTERR=real, LAGERR=real,&
       NBIN=integer, BINMAX=real, LFILE=string, TFILE=string
```

An `LCAVITY` has ten real attributes, one integer attribute, and two string attributes:

`L` The length of the structure (default: 0 m).

`DELTAE` The unloaded on-crest energy gain (default: 0 MeV).

`PHI0` The phase lag in multiples of 2π (default: 0 … on-crest).

`FREQ` The RF frequency (default: 0 MHz).

`ELOSS` The energy loss due to self beam loading (default: 0 V/C).

The effect of the structure on the beam energy, *E*, is:

$$\Delta E \text{ (MeV)} = \texttt{DELTAE} \cos(2\pi(\texttt{PHI0}\text{-}f\Delta t)) - \Delta E_{loss}$$

where $f = 10^6 \times \texttt{FREQ}$, ΔE_{loss} (MeV) $= 10^{-6} \times \texttt{ELOSS} \times N_b \times e$, and N_b is the number of particles per bunch (see the `NPART` attribute of the `BEAM` command).

`APERTURE` The structure iris radius (default: 0 m).

`E0` The beam energy at the entrance to the structure (default: 0 GeV); not used in MAD.

`VOLTERR` The unloaded on-crest energy gain error (default: 0 MeV); used in computing RF kicks.

`LAGERR` The phase lag error in multiples of 2π (default: 0); used in computing RF kicks.

`NBIN` Used in wakefield calculations (default: 0).

`BINMAX` Used in wakefield calculations (default: 0).

`LFILE` The name of a file containing a tabulation of the structure's longitudinal wakefield Green's function in V/C/m.

`TFILE` The name of a file containing a tabulation of the structure's transverse wakefield Green's function in V/C/m^2.