

Them!

I have been amazed to see ants emerge seemingly unharmed after being zapped in the microwave, usually after hitching a ride on my coffee cup. They seem to run around quite happily while the microwave is in operation. How can they survive this onslaught?

The phenomenon that the ants take advantage of is that microwaves form standing waves within the oven cavity.

So in some places in the oven space, the energy density is very high, whereas in others it is very low. This is why most ovens have turntables to ensure that cooking food is heated evenly throughout.

This standing wave pattern can be observed by putting a static tray of marshmallows in the microwave, and heating for a while. The result will be a pattern of cooked and uncooked marshmallows. The standing wave pattern, however, varies according to the properties and position of any material within the oven, such as a cup of water.

The ant will experience this pattern as hot or cold regions within the oven and can thus locate the low-energy volumes. If the ant is in a high-field region, its high surface area to volume ratio allows it to cool down more quickly than a larger object while it searches for a cold spot.