

Dynamic Test of SSRF Storage Ring Girder-Magnet Assembly

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Mechanical stability is very important to beam stability. In order to study the dynamics of SSRF storage ring girder, a girder prototype with wedge and ball bearing support was designed and manufactured. And a girder-magnet prototype system was assembled. Dynamic tests were carried out on this girder-magnet prototype system.

The results show that the lowest eigenfrequency of the girder prototype is 19.5Hz under three points support and 23.5Hz under four points support respectively. It shows that four points support can get higher eigenfrequency. The eigenfrequency of the girder body itself is 72Hz, which indicates that in this girder-magnet prototype system, the adjustable support is the weak point.

Frequency response (excited by hammer) shows that the Q value of the lowest eigenfrequency is 7.6 under three points support and 4.9 under four points support respectively. While for the frequency response between each quadrupole magnets and ground vibration, the Q value of the lowest eigenfrequency is from 52.5 to 25.3 in lateral direction and below 5 in vertical direction.

Now the structure optimization for improving the first eigenfrequency of the system and damping devices investigation for decreasing the Q value from the ground to the magnets is in process.