Abstracts

A New Six-Port Microwave Network: Six-Port Magic Junction

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A new six-port junction, which consists of an H-plane symmetrical waveguide Y junction with a coaxial line on one side of its axis and a circular waveguide on its other, is proposed. The scattering matrix of the junction in an ideal case is derived using the symmetry properties of the structure. If both the coaxial and the circular waveguide arm are matched without destroying the symmetry, the arms of the junction are automatically matched and isolated as well, similar to the side arms of a conventional magic T. Therefore, it is called a six-port magic junction. These properties are confirmed by experiment in X-band. Lastly, some interesting applications based on the properties of the six-port junction are discussed.

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