



**SPARK MUSEUM**  
EARLY RADIO AND SCIENTIFIC APPARATUS

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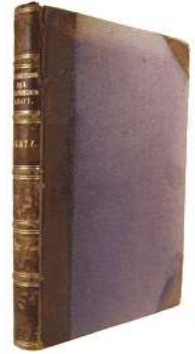
## The Discovery of Radio Waves - 1888

### Heinrich Rudolf Hertz (1857-1894)



Heinrich Rudolf  
Hertz  
(1857-1894)

**Heinrich Hertz** was the first to send and receive radio waves. James Clerk Maxwell had mathematically predicted their existence in 1864. Between 1885 and 1889, as a professor of physics at Karlsruhe Polytechnic, he produced electromagnetic waves in the laboratory and measured their wavelength and velocity. He showed that the nature of their reflection and refraction was the same as those of light, confirming that light waves are electromagnetic radiation obeying the Maxwell equations.

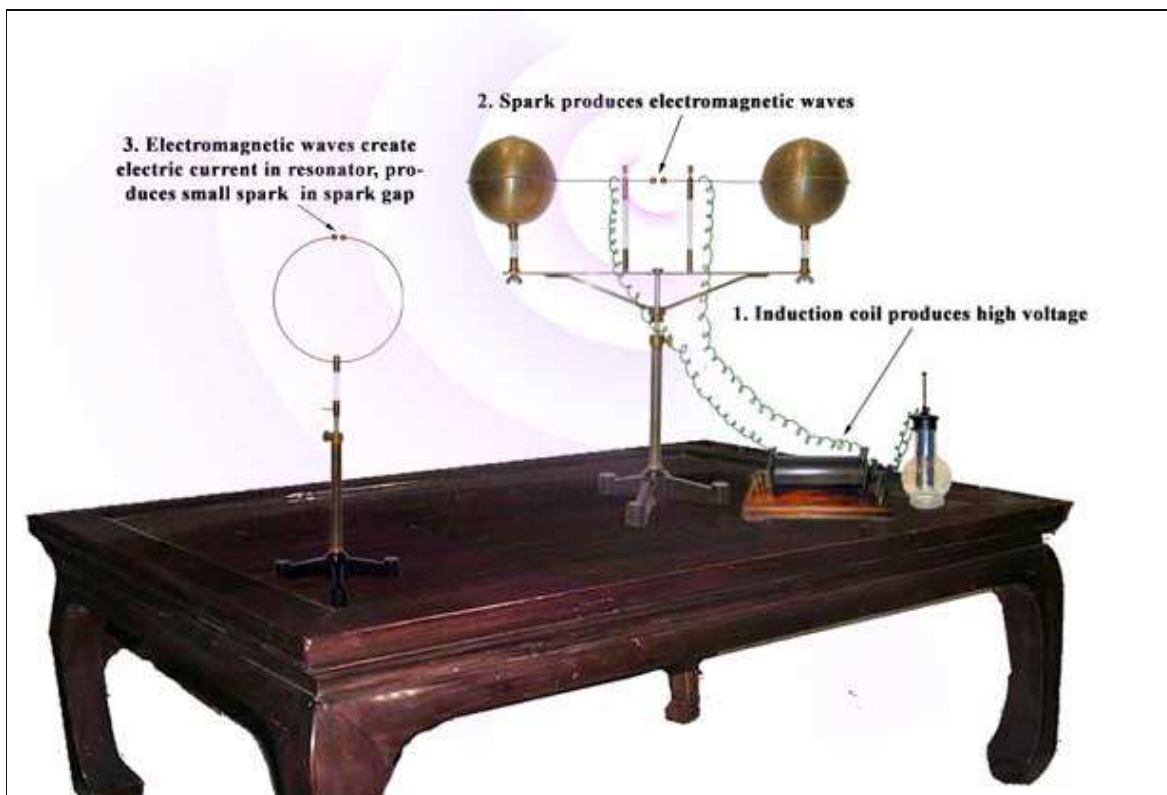


*Untersuchungen Ueber Die Ausbreitung Der Elektrischen Kraft*  
(Investigations on the Propagation of Electrical Energy)  
Heinrich Hertz  
1892

All of these findings were first published in the journal *Annalen der Physik*, (see below right) then in Hertz's first book, *Untersuchungen Ueber Die Ausbreitung Der Elektrischen Kraft* (*Investigations on the Propagation of Electrical Energy*), shown at right. His book is considered to be one of the most important works of science. This is where he first describes his confirmation of the existence of electromagnetic waves.

*Annalen der Physik und Chemie* is one of the oldest physics journals worldwide. The journal, still in publication today, publishes original papers in the areas of experimental, theoretical, applied and mathematical physics and related areas.

### Hertz's Experiment:



There are 12 complete volumes of *Annalen der Physik und Chemie* in my collection. Included are Hertz's many papers proving the Maxwell hypothesis on the propagation of electromagnetic waves. These papers laid the foundation for the development of radio and electromagnetic wave transmission applications. Also included are more Hertz papers plus others by Roentgen, Planck, Boltzmann, Angstrom, Helmholtz.



**Early experimental Hertz radiator and resonator  
for creating and detecting Hertzian waves  
~1890**

Simple spark gap apparatus similar to this was the first ever built to produce and detect radio waves



*Annalen der Physik und Chemie*  
1887 - 1890