

SPEAKING IN LIGHT - Jupiter radio signals as deflections of light-emitting electron beams in a vacuum chamber

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Abstract

Light emitting electron beam generated in a vacuum chamber is used as a medium for visualizing Jupiter's electromagnetic radiation. Dual dipole array antenna is receiving HF radio signals that are next amplified to radiate a strong electromagnetic field capable of influencing the propagation of electron beam in plasma. Installation aims to provide a platform for observing the characteristics of light emitting beam in 3D, as opposed to the experiments with cathode ray tubes in 2-dimensional television screens. Gas giant 'speaking' to us by radio waves bends the light in the tube, allowing us to see and hear the messages of Jupiter - God of light and sky.

1. Introduction

Ancient roman god of light and sky and the protector of State and its laws, Jupiter, unapparent as it seems, still holds its influence today. Once a strong religious and political force, the 'Shining Father' of the Roman Empire, today Jupiter transcribes as an influence on our electromagnetic spectrum. Referred to as a gas giant, this planet stands out in our Solar system by its mass and magnetosphere and is easily distinguishable on our night sky by being the third brightest object after Moon and Venus.

Electric glow discharge, visible in neon tubes or cathode ray tubes of early television sets is generated in a plasma state where the excitation collisions of the electrons generate photons. Crookes tube is one of the early experimental discharge tubes consisting of a (partial) vacuum chamber, a cathode and an anode. Electron beam is generated by a high DC voltage applied between the electrodes and is projected in a straight line. One of the early realizations is that the electron beam is deflectable by both electric and magnetic fields. This peculiarity is what I would like to build upon and experiment with.

2. Installation framework

The intention is to use Jupiter's radio signals as a deflecting electro-magnetic field in a Crookes tube setup. A dual dipole array antenna is setup to a frequency range of about 18 – 22 MHz, having 20.1 MHz as an operating frequency. Jovian radio antenna is steered to the Jupiter's south elevation angle in the northern hemisphere as predicted for the time of observation in order to obtain the highest gain (dBi). Signal is then amplified and introduced to the vacuum chamber as an accelerating electric field, perpendicular to the cathode ray trajectory. Depending on the strength of the electro-magnetic field induced the deflection rates will vary and in accordance to the L-bursts and S-bursts transmitted from Jupiter the deflection frequency will vary, exhibiting patterns of electron beam bending.

3. Summary and Conclusions

There have been very few artworks dealing with light emitting beam properties in accordance to the electromagnetic fields. One of the most known ones are the "Magnet TV" by Nam June Paik from 1965 and "CRT MGN" by Carsten Nikolai presented at the 17th Media Festival in Japan in 2013. Both works are using cathode ray tubes and 2-dimensional surfaces to show the propagation deflection patterns. *Speaking in Light* aims to replace the television screen with a clear glass vacuum tube thus facilitating 3-dimensional observation of this natural phenomenon. Electromagnetic wave imaging of Jupiter signals in plasma therefore represents a separate layer striving to bring forth the analogies or connections between mythology and nature - archetypes and scientific facts.

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