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EARTH FLASH - A SCIENCE & ART PROJECT CREATING AN EARTH-BASED ENVIRONMENT  
TO EXPERIENCE LIGHT FLASHES ASTRONAUTS DO HAVE IN SPACE**Abstract**

Around 80 per cent of the astronauts report about light flashes in space which appear even with closed eyes in various forms like luminous dots, streaks, stars or even clouds. Experiments identified the origin of this entoptic phenomenon on the astronaut's retina in the direct impact of high energetic cosmic rays that originate from the depths of space.[1] There were only a few reports about similar visual experiences on earth shielded by its atmosphere. In the 1950's a researcher in the USA exposed him self in a dangerous self-experiment to the particle beam in an accelerator facility. Also brain cancer patients exposed to ion beams for therapeutic purposes report about light flashes when the beam hits the retina.

The purpose of the *Earth flash* project is to develop a harmless alternative to enable the experience of light flashes on earth. This might result not only in an art installation for the larger public, but might be also an option to be included in the astronaut training program especially with regards to long term missions. Here the transdisciplinary project connects astro particle physics, aeronautics, psychology, neuro- and radiobiology. To create such an entoptic sensorium magnetic impulses are used to excite the visual system to produce magnetospheres. Yet at the turn of the 20th century researchers report about light flash experiences having exposed humans to collapsing magnetic fields. In 2009 the author made a first self experiment stimulating the visual cortex with Transcranial magnetic stimulation (TMS) at the University Clinics in Ulm.[2] In a next step a solution is focussed exciting the retina with collapsing magnetic fields of at least 1,5 Tessler.

The paper deals with the author's research started in the context of the project proposal *Cosmic flash* developed 2006 for the Arts Catalyst's study into cultural utilisation of the ISS commissioned by ESA. It will be reported about the author's series of interviews with astronauts talking about their light flash experiences. Some of them underline that light flashes might be a psychological factor coming into play during long term missions especially out of the earth's protecting magnetic shield. After having given a short historic summary on magnetosphere research, the paper will present the basic conceptual and technical design for the *Earth flash* project.

References: [1] Fuglesang, C.: Nuclear Instruments and Methods in Physics Research (2007) 580.

[2] [www.imagination.net/protocol/cosmicflash.html#magnetospheres](http://www.imagination.net/protocol/cosmicflash.html#magnetospheres).