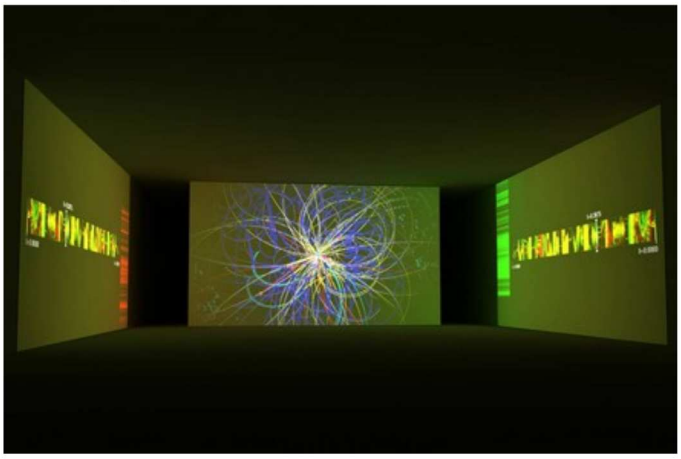
Digital Graffiti - a psychedelic exploration of particle physics

by Polly Bennett. Published: 30 March 2012

Digital Graffiti

After about 3 minutes the space age music and luminous, swirling patterns on screen will put you into a kind of swaying trance. This video is a cross between a Pink Floyd sound and light show, with a lone bass guitar thrumming an occasional beat, and the trippy sound effects reminiscent of a science fiction film. At one point the video zooms in on coloured lines stretching into the distance like it's jumping into hyperspace. The whole project has the feel of a 1970s prog-rock concept album, but its true vocation is as an inspired portrait of particle physics. Joking aside, the clashing colours elegantly highlight the beauty of the patterns of reality made by particle tracks after a collision.

Bruno Alessandro, Marco Brizio



Digital Graffiti installation with sonification stripes

This psychedelic experience is the concept of ALICE Silicon Drift Detector researcher Bruno Alessandro. The film, *Digital Graffiti from a Technological Era*, is part of a series of artistic representations of ALICE particle collisions, based on the patterns produced in event displays of real ALICE data. "I tried to create something that is disconnected from physics, in such a way that when you see it you don't know what it is," Bruno explains. Although he admits that most people from CERN would have an idea, the general public most likely would not know they were looking at physics. "To me it's a sort of inspiration from particle collisions and the techniques involved in these. More less it's been the work of 1000 people [therefore the entire ALICE Collaboration] to get to Digital Graffiti."

With the help of Marco Brizio from **alessiostudio** in Turin, Bruno selected particular angles and perspectives of interesting event displays to produce still images and capture animated sequences for the video. After enhancing these images and sequences with colours and different backgrounds, it fell to Marco to produce the video and add sound in the form of sonification stripes. The music was created using a distorted bass guitar, played by Marco himself, and image sonification techniques, based on software for the visually impaired. This software analyses video frames and converts the picture into sound by using different pitches to represent different heights, angles, and so on of the image. These build up into chords. As each frame is analysed the entire 'soundtrack' becomes, what Marco and Bruno term, a sonification stripe. "It's a little bit complicated!" explains Marco after describing the process. However, in a previous article for ALICE Matters Bruno explains that, "The resulting soundtrack is strongly connected to and synchronised with the video and makes Digital Graffiti a complete audiovisual experience."

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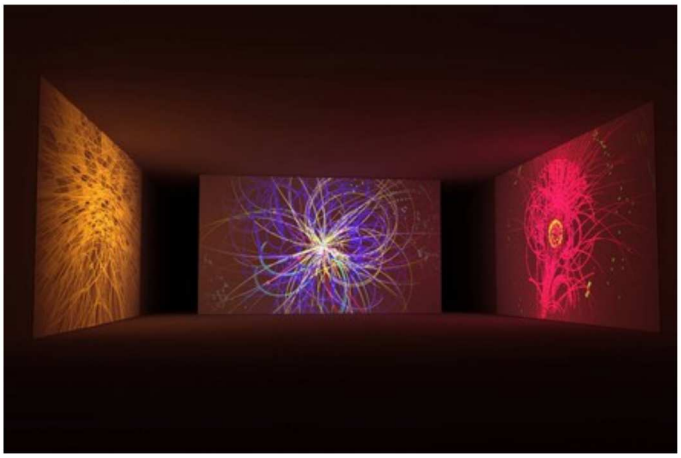

The Digital Graffiti video projected onto 3 walls

The video was originally planned for projection in an outdoor space for the 'Science in the City' section of the Euroscience Open Forum, Turin in 2010. However, lack of sponsors meant Bruno did not have the funds to do this. Instead, ALICE provided some funds to complete the video at the end of 2010. Bruno has since expanded the Digital Graffiti series, including high resolution pictures (used in the ALICE 2012 calendar), still images engraved or printed on plexiglass (of which one example is hanging in the ALICE secretariat), the video, and hopefully in the future an installation.

The Digital Graffiti concept is based on a beautiful and elegant analogy between the graffiti of Neolithic cave painting and modern 'digital graffiti', whereby digital representation techniques are used to capture a picture of particle collisions. Both attempt to represent reality, whether this is an ancient landscape or particle physics. "It's fascinating to consider that curiosity and the desire to describe reality led to the development of both techniques," Bruno says. The parallel is double, as not only does ALICE 'graffiti' the reality of particle collisions onto computers, but Bruno uses the resulting digital graffiti, or event displays, to produce his own interpretation of particle physics in the form of an artwork; much as Neolithic people used artwork for their own interpretations of what they saw in ancient times.

For the future Bruno is planning an installation artwork of Digital Graffiti, where the video is projected onto 3 walls of a dark room accompanied by digital screens explaining the development of the sonification stripes. There are also plans for outdoor projections and a 3D video.

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