SUPPLIER INSIGHTS

IQ STRUCTURES

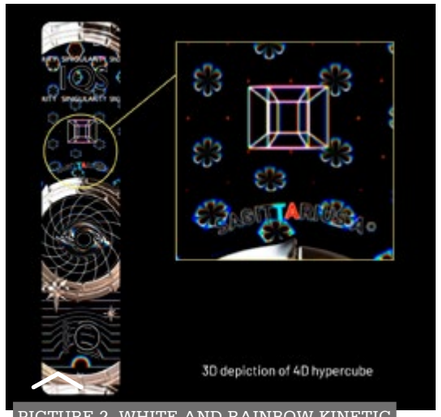
SINGULARITY – A COMPLEX OF NOVEL AWARD WINNING VISUAL EFFECTS

Sagittarius A* is a massive black hole in the centre of our galaxy. Its existence had been known for a long time, but it was first detected on 20 May 2022. That day in May, a team of scientist reconstructed and visualised the signals coming from the centre of the Milky Way. The visual embodiment of Sagittarius A*, also known as the Singularity, was finally uncovered. To pay tribute to such a technological and intellectual achievement, the mastering team of IQ Structures decided to mimic the visual behaviour of the black hole using the means of advanced diffractive optics. The idea of a complex optical security element called Singularity was born.

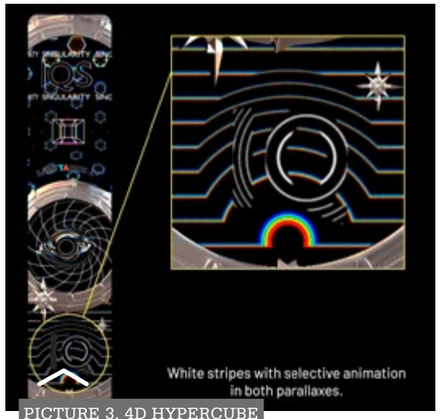
"*The singularity can be explained to us laypersons as a place where all the things that apply around it don't apply. Figuratively, then, like a waterfall in a desert, a tulip in an ice field, or a black hole in the middle of the Milky Way. And it is this symbolism that our hologram evokes. We wanted to create an optical security element that would be completely different in nature from all conventional, albeit cutting-edge solutions, qualitatively different, visually different and unique,*" stated Senior Designer of IQ Structures Jan Dřevíkovský.

The sophisticated mathematical algorithms together with advanced fabrication made it possible to move the boundaries of diffractive optics beyond the known visual patterning. Translation, rotation, morphing either discreet or animated in a non-chromatic 3D appearance. Such effects are far beyond the classical approach of diffractive optics. Based on massive computational power and the fabrication of functional easy-to-recognise nanoelements, distinctive features capturing user´s attention are created. The particular effects may be used as standalone security elements (see pictures 1, 2 and 3) or as synthetic all-in-one features (see picture 4). You can reveal the animation of the Singularity by scanning the QR code below.

PICTURE 1, MOVING OBJECTS COVERING THE BACKGROUND - THIS IS AN INNOVATIVE TECHNOLOGICAL CONTRIBUTION

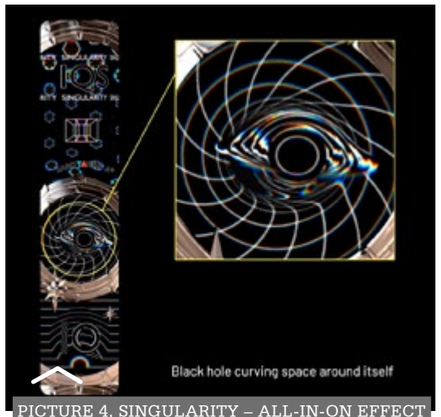


PICTURE 2, WHITE AND RAINBOW KINETIC EFFECTS ON 3D ANIMATED OBJECTS – IQ STRUCTURES BRINGS STANDARD 2D EFFECTS INTO 3D PERCEPTION



PICTURE 3, 4D HYPERCUBE (2-AXIS ANIMATED 3D PROJECTION)

„Combining the bright visual imagination of our designers, sophisticated mathematical algorithms and the advanced technology of nanofabrication, we have created a new level of diffraction-based optical security features. Interactive features that are simple to be unambiguously authenticated and, due to their nature of diffraction optics, subtle enough for easy and seamless integration in any banknote substrate. Our novel features offer the customers serious protection of their currency based on a scientific approach and the latest origination technologies“, commented Robert Dvořák, Managing Director.



PICTURE 4, SINGULARITY – ALL-IN-ON EFFECT MIMICKING THE BLACK HOLE BEHAVIOUR USING ROTATION, TRANSLATION, MORPHING AND ANIMATION IN 3D SPACE

The fact these new effects are based on diffraction optics is extremely important for the banknote manufacturers. For the proper visual functionality, only submicron deep structures are required. This means the effects are supplied as a standard foil based solution in the form of a thread, stripe or patch. It provides the manufactures with an easy and plug-and-play integration of the features on or into any banknote substrate.

„From time to time, a very special ingenious moment arises, all the elements fit together in a smooth and gentle swing – a scientific discovery creates enormous enthusiasm inside your mastering team, which leads to the development of novel security features awarded the 'The Best Origination' at the Excellence in Holography awards organised by IHMA. I´m very honoured to be a part of such a moment", summarised Petr Franc, the CEO of IQ Structures.

CLICK OR SCAN

IQ STRUCTURES

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TECHNICAL FACT SHEET

- Colourless optical security features
- Sophisticated mathematical algorithms
- Advanced nanofabrication
- Wide range of animated non-chromatic 3D effects