

The Animated Precision of QUANTUM stripe™

In the evolving landscape of currency design, the boundary between scientific innovation and artistic expression is becoming increasingly blurred. Central banks have long sought features that are not only impossible to replicate but also intuitive for the public to verify.

Authentix addressed this challenge with QUANTUM stripe™, based on the company's KolorOptik® technology, which was launched in 2023 to deliver a combination of movement, 3D stereoscopic depth, and multicolour effects in an ultra-thin form factor (see CN August 2023).

It has now gone a step further with its latest evolution of its QUANTUM stripe™ platform, introducing full frame-by-frame animation to the world of nano-optic security features.



A new visual vocabulary

Animation within traditional banknote security features has often been limited to 'optical tricks' or coarse lenticular effects with low frame counts. According to Authentix, the QUANTUM stripe represents a paradigm shift by enabling smooth, fluid motion within a secure, nano-scale overt feature.



Figure 1: Example of multi frame animation.



Figure 2: Traditional low frame animation.

This technology allows for a sophisticated range of multi-coloured effects, including depth, pulsing, rotation, seamless image switching, and controlled appearance and disappearance, without the use of pigments or dyes.



Figure 3: Examples of animation effects.

National symbols – long the cornerstone of currency design – can now be brought to life with unprecedented precision. Examples could include a sun that rises and sets, flames that flicker, or stars that swivel as the note is tilted.

These are not merely decorative elements, says Authentix; they represent a 'visual storytelling' approach to security, where movement carries both meaning and an inherent authentication purpose.

The science of human perception

The shift toward smooth animation is rooted in neuroscience and evolutionary psychology. Humans are biologically wired to detect and react to natural movement – a trait developed over millennia for survival. By mimicking these natural patterns, QUANTUM stripe creates a human-centric authentication process.

Research suggests that different motion patterns elicit specific emotional responses. While fast-paced pulsing can create excitement; slower, flowing animations like growing or shrinking promote feelings of ease and trust. Because these movements are intuitive, the brain can recognise a genuine banknote faster and more reliably than it could a static, complex security feature.

As a result, this inherent authentication provides a massive barrier to counterfeiters, who cannot replicate the fluid, high-frame-rate transitions produced by nano-scale optics.

The intersection of art and trust

For central banks, says Authentix, the QUANTUM stripe offers a dual benefit: security and resonance. The technology is highly customisable, allowing issuers to draw on cultural and national themes to create a deeper connection with the public. By using plasmonic colours and nano-optic precision, designers can integrate complex cues – such as images that only appear at specific angles – into a single, elegant feature.

This innovation marks a significant leap for the Authentix nano optics platform. It moves beyond traditional protection to create features that captivate and inspire, the company notes (having acquired the platform when it bought the assets of Meta Materials last year).

The new technology is being featured in a new house note – Time in Motion – which has been developed through collaboration with KURZ (Authentix's production partner for QUANTUM stripe), Koenig & Bauer Banknote Solutions (KBBS), and Landqart.

The note will feature in the upcoming Concept Note supplement, due for publication next month.

The technology will also be presented at Banknote Conference in Washington DC in May.