

ANALEMMA LABS



— USER GUIDE · V1.0 · WINDOWS

ScienceFX

User Guide

Procedural visual engine for Adobe After Effects – tessellations, attractors, plasma fields, cymatics and optics, with a dedicated Audio Reactor.

VERSION

v1.0

PLATFORM

Windows only

RENDERING

CPU-bound

HOST

After Effects 2022+

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Introduction

ScienceFX is a plug-in for Adobe After Effects that generates procedural graphics based on scientific and mathematical concepts: tessellations and kaleidoscopes, chaotic attractors, plasma fields, cymatics patterns, wave mechanics, procedural optics and more.

It is designed for motion designers and visual artists who want complex, animatable looks, with a dedicated **Audio Reactor** module to make the graphics react to audio.

A useful clarification: ScienceFX uses scientific/mathematical names and concepts as a **visual and procedural engine**. The terms (attractors, fractals, conformal transformations, resonance patterns, etc.) serve to identify the implemented visual models and algorithms; they do not constitute a scientifically rigorous simulation nor a claim of physical accuracy.

ScienceFX is made up of two plug-ins:

01 ScienceFX.aex – the main effect that performs the rendering.

02 ScienceFXAudioCompanion.aex – a separate AEGP companion that analyzes the audio and generates the Beat Driver keyframes for the Audio Reactor.

Requirements and compatibility

Operating system	Windows. In v1.0 there is no macOS build .
Host	Adobe After Effects (CC). ScienceFX v1.0 is compatible with Adobe After Effects 2022 and later on Windows.
GPU	Not required. Rendering is CPU-bound ; there is no GPU acceleration.
Color depth	8, 16 and 32 bpc, including 32-bpc float mode.
CPU / RAM	High usage during preview and render (procedural rendering); at idle, CPU usage is low.

• COMPATIBILITY STATEMENT

ScienceFX v1.0 is compatible with Adobe After Effects 2022 and later on Windows. Internal tests were performed with After Effects 2022, 2023, 2024 and 2026 on Windows 10 and Windows 11.

• PLATFORM NOTE

Windows only – no macOS build · CPU-bound rendering – no GPU acceleration. High CPU/RAM during preview and render is expected; at idle, CPU usage returns to a low level.

— 03 INSTALLATION

Installation

In brief (for the full guide see `README_INSTALL.md`):

1. Quit After Effects.
2. Copy **both** files `ScienceFX.aex` and `ScienceFXAudioCompanion.aex` into the After Effects Plug-ins folder on Windows (`...\Support Files\Plug-ins\`).
3. Restart After Effects.
4. The effect is applied from the **Effects & Presets** panel by searching for “ScienceFX” (or from the **Effect** menu, in the category assigned at installation time); the companion commands are in the **Animation** menu.

• TIP

Both `.aex` files must be copied. Without `ScienceFXAudioCompanion.aex` the Audio Reactor bake commands will not appear in the **Animation** menu.

— 04 INTERFACE OVERVIEW / UI

Interface overview (UI)

Once applied to a layer, ScienceFX exposes its controls in the **Effect Controls** panel, organized into **topics** (collapsible groups). The general logic is:

- The **patterns** and **mirrors** define the base geometry of the kaleidoscope.
- The **creative modules** (Fractal Lab, Space Curvature, Chaos, Procedural Optics, Plasma, Thin-Film, Astrophysics, Reaction-Diffusion, Quantum, Cymatics) are enabled individually with an **Enable** checkbox and add specific effects.
- The **finishing** controls (Pyramid Glow, Global Color) work on the final look.
- **Master Evolution** animates the whole set globally over time.
- **Audio Reactor** modulates the parameters based on the audio.

Each creative module has its own local **Reset** button (see §7).

The modules are designed to be composable: you can enable several modules together, bearing in mind that each one adds computational load.

Pattern and Mirror

ScienceFX uses a two-level structure: first you choose the **group**, then the specific **bank**.

Pattern

Pattern Group (auto) : Geometric or Mathematical .

GEOMETRIC Geometric Patterns

None, Diamonds, Octagons, Squares, Triangles, Hexagonal, Aperiodic Tiling (5-Fold), Logarithmic Spiral, Truchet Tiling, Voronoi Cells, Sierpinski Triangles, Phyllotaxis, Lissajous, Spiral Truchet, Apollonian Inversion.

MATHEMATICAL Mathematical Patterns

None, Complex Sine, Joukowski, Bipolar, Modular $SL(2, \mathbb{Z})$, Octagonal Aperiodic, Pi-Cotangent, Quasicrystal, Poincare Disk, Conformal Voronoi, Apollonian Gasket, Truchet Curves, Lotus Mandala, Flowsnake Fractal, Cardioid Roulette.

Mirror

Mirror Group (auto) : Classic or Advanced .

CLASSIC Classic Mirrors

None, Star, Unfold, Hexa, Diamond, Pinwheel, Triforce, Polar, Radial, Recursive Spiral Mirror, Icosahedral, Glide Reflection, Poincare Disk, Little Planet, Mobius Fold.

ADVANCED Advanced Mirrors

None, Asymmetric Polar, Complex Power, Hyperbolic, Box Fractal, Loxodromic, Glitch Fold, Non-Linear Vortex, KIFS Snowflake, Dihedral D_N , Iterative Poincare, Log-Polar Spiral, Riemann Inversion, Kleinian Limit, Schwarz-Christoffel, Trefoil Knot, Hyperbolic Star, Aperiodic 5-Fold Mirror, Golden Spiral.

The main geometric parameters that govern patterns and mirrors include **Segments** (number of kaleidoscope sectors), **Size** , **Topology Mix** , **Chimerism Split** , **Z Dist / Stretch X / Stretch Y** , **Inside Shift X/Y** , **Inside Z Dist** and **Kaleido Amount** .

• NOTE

The Pattern/Mirror popups are **not** driven by the Audio Reactor. The audio modulates continuous parameters (size, intensity, phases, rotations...), not the selection of the pattern or mirror type.

06 MAIN CREATIVE MODULES

Main creative modules

All the modules below are enabled with their respective **Enable** checkbox and have a local Reset.

Fractal Lab

Enable Fractal Lab , **Fractal Mode** (None, Golden Spiral, Chaos Ripple, Julia Fractal, Burning Ship, Tricorn Fractal), **Math Phase / Evol** , **Math Zoom** , **Chaos Delta** , **Orbit Trap Mode/Radius/Color** .

Space Curvature non-Euclidean

Enable Space Curvature , **Space Curvature** (Flat (Euclidean), Hyperbolic (Poincare Disk), Spherical (Riemann), Logarithmic Spiral (Droste)), **Mobius Real** , **Mobius Imag** , **Droste Scale** .

Chaos

Enable Chaos , **Chaos Mode** (Hénon Map, Lorenz Attractor, Rössler Attractor, Aizawa Attractor), **Param A / B / C** . The chaotic attractors produce organic, unpredictable textures.

Procedural Optics

Enable Procedural Optics , **Noise Type** (None, Simplex 3D, Strange Attractor, Curl Noise, Worley Cellular), **Noise Freq / Amp / Evol** , **Optical Refraction** , **Fluid Advection** , **Attractor A / B** , **Caustic Intensity / Tolerance** .

Plasma Fields

Enable Plasma , **Field Type** (Dipole, Quadrupole, Taylor-Green, Ferrofluid Spikes, Magnetic Vortex), **Intensity** .

Thin-Film Interference

Enable Iridescence , **Film Thickness** , **Index of Refraction (IOR)** , **Incidence Angle** , **Birefringence** . Produces soap-bubble / oil-type iridescence.

Astrophysics

Enable Astrophysics , **Black Hole Mass** , **Event Horizon Radius** , **Chromatic Dispersion** , **Dispersion Feather** . Lensing and dispersion effects.

Reaction-Diffusion

Enable Reaction-Diffusion , **R-D Scale** , **R-D Mix** , **R-D Evolution** . Biological reaction-diffusion patterns.

Quantum Wave Mechanics

Enable Quantum Mechanics , Wave Frequency , Wave Phase , Wave Phase Evol , Quantum Mix . Wave interference.

Cymatics

Enable Cymatics , Harmonic N , Harmonic M , Cymatics Scale , Distortion Intensity , Luminescence , Cymatics Phase . Resonance (cymatics) patterns.

In addition to the modules, ScienceFX offers composition and finishing controls such as Edge Feather , Wrap X/Y , Filter , Opacity , RGB Split , Seam Width/Color , crop (Crop Top/Bottom/Left/Right) and mask/displacement controls.

— 07 LOCAL RESETS

Local Resets

Each module has a dedicated Reset button (e.g. Reset Fractal Lab , Reset Non-Euclidean , Reset Chaos , Reset Procedural Optics , Reset Plasma Fields , Reset Thin-Film , Reset Astrophysics , Reset Reaction-Diffusion , Reset Quantum , Reset Cymatics , Reset Pyramid Glow , Reset Global Color , Reset Evolution , Reset Audio Reactor).

Pressing a Reset returns **only that module's parameters** to their default values, leaving everything else intact. It is the recommended way to start over from a single module without resetting the entire effect.

• ISOLATED RESET

In particular, the Reset Audio Reactor is isolated: it touches only the Audio Reactor parameters (Mode, Amount, Response, Routing, Beat Driver and the Custom Matrix slots).

— 08 MASTER EVOLUTION

Master Evolution

The Master Evolution topic animates the effect globally over time.

- Evolution Mode : Off or Manual .
- Master Evolution : the global evolution value/phase (animatable with keyframes).
- Evolution Amount : how much the evolution affects the whole.

In practice, instead of animating dozens of parameters by hand, you can drive the overall evolution of the look with a single control by placing keyframes on Master Evolution .

— 09 GLOBAL COLOR

Global Color

The **Global Color** topic defines the final color look.

- **Color Mode** : **Off** , **Duotone** , **Heat** , **Electric** , **Solar** .
- **Color Amount** : intensity of the applied color grading.
- **Color A / Color B** : the two color swatches used (especially relevant in Duotone).

Global Color also works correctly in 32-bpc float projects, where values can extend beyond the 0–1 range (HDR).

— 10 AUDIO REACTOR

Audio Reactor

The Audio Reactor makes the graphics react to audio. It involves **two distinct components**:

- the **ScienceFX effect**, which reads a parameter called **Beat Driver** and modulates the targets;
- the **AEGP companion**, which analyzes the audio and *writes* the keyframes onto the Beat Driver.

The effect-side controls, in the **Audio Reactor** topic, are:

- **Audio Reactor Mode** : **Off** , **Test Pulse** , **Driver** .
 - **Off** — no reaction (identity).
 - **Test Pulse** — a deterministic synthetic envelope to try out the setup **without** reading real audio.
 - **Driver** — the effect reads the Beat Driver keyframes (those generated by the companion).
- **Audio Amount** : how much the envelope modulates the targets.
- **Audio Response** : shapes the form/response of the envelope.
- **Audio Routing** : where the audio energy goes (see §12).
- **Beat Driver** : the keyframable bridge parameter onto which the companion writes the envelope.
- **Map 1–4 Target / Depth** : the Custom Matrix slots (see §13).

- SEE ALSO

For the full operational workflow, see `SCIENCEFX_AUDIO_REACTOR_GUIDE.md` .

— 11 AEGP COMPANION

AEGP Companion

The **ScienceFX Audio Companion** is a separate plug-in that appears as commands in the **Animation** menu:

- ScienceFX: Bake Audio Reactor Envelope (**Balanced** profile, default)
- ScienceFX: Bake Audio Reactor Envelope - Punchy
- ScienceFX: Bake Audio Reactor Envelope - Smooth
- ScienceFX: Bake Audio Reactor Envelope - Minimal Keys

Usage workflow: select the layer with ScienceFX, launch the bake command. The companion renders the **composition's audio mix**, computes a normalized 0–100 RMS envelope, applies smoothing/reduction and writes the keyframes onto the **Beat Driver**. The entire operation is wrapped in an Undo group, so it can be undone with a single Ctrl+Z.

• ARCHITECTURE NOTE

As an architectural principle, the companion **writes only the Beat Driver** and **does not know about** the Audio Routing or the Custom Matrix: the interpretation of the keyframes (routing, matrix, module gating) takes place entirely on the effect side. This keeps the two components decoupled and stable.

— 12 AUDIO ROUTING / macro

Audio Routing (macro)

Audio Routing is a macro routing that decides which aspects of the effect react to the envelope:

ROUTING	BEHAVIOUR
Glow	Modulation tied to the glow (gated by the Glow module where applicable).
Cymatics	Modulates the cymatics fields (requires Cymatics enabled).
Plasma	Modulates the plasma fields (requires Plasma enabled).
Structure	Structural fields / global transformation; does not require matrix slots.
Energy	A moderate macro combination.
All	Global macro routing; does not use the Custom Matrix and responds even if all Map slots are Off.
Custom Matrix	Uses exclusively the Map 1–4 slots (see §13).

• KEY RULE

All is an internal macro and does not use the Custom Matrix. The Custom Matrix is used **only** when Audio Routing is set to **Custom Matrix**, and in that case only what you have configured in Map 1–4 counts.

Each target still respects the **enable of its own module**: the Audio Reactor does not silently switch on a disabled module. If you route to a module that is off, you will not see any effect until you enable it.

— 13 CUSTOM MATRIX / 4 slots

Custom Matrix (4 slots)

The **Custom Matrix** offers 4 independent mapping slots – **Map 1** , **Map 2** , **Map 3** , **Map 4** – each with:

- **Target** : one of the 30 available targets (the first is **Off**).
- **Depth** : the depth/sign of the modulation (negative inverts the direction).

The 30 targets are:

01 Off	02 Size	03 Segments
04 Topology Mix	05 Chimerism Split	06 Global Z Dist
07 Inside Shift X	08 Inside Shift Y	09 Inside Z Dist
10 Inside Twirl	11 Glow Exposure	12 Plasma Intensity
13 Cymatics Intensity	14 Global Color Amount	15 Math Phase
16 Math Zoom	17 Chaos Delta	18 Noise Evolution
19 Thin-Film Thickness	20 Event Horizon	21 Quantum Phase
22 Quantum Evolution	23 Cymatics Luminosity	24 Cymatics Phase
25 Glow Radius	26 Glow Threshold	27 Global Rotate
28 Kaleido Rotate	29 Inside Rotate	30 Cymatics Rotation

The Custom Matrix is active **only** with Audio Routing = **Custom Matrix** . Set at least one Target ≠ Off and a Depth ≠ 0 to get a reaction. You can combine several slots toward different targets to build articulated audio reactions (e.g. Map 1 → Size, Map 2 → Glow Exposure, Map 3 → Cymatics Phase).

— 14 BAKE PROFILES

Bake Profiles

The companion offers four bake profiles, selectable from the corresponding menu command. They differ in smoothing, keyframe reduction and responsiveness:

PROFILE	CHARACTER
Balanced	Default profile, a good compromise between fidelity and smoothness.
Punchy	A more marked, immediate reaction on transients.
Smooth	A softer envelope, less jittery.
Minimal Keys	Fewer keyframes, more manageable and lightweight curves.

Choose the profile based on the audio material and the look you want. You can always re-bake with a different profile: a new bake clears the Beat Driver keyframes in the work area before rewriting.

— 15 PERFORMANCE

Performance

● PERFORMANCE NOTE

ScienceFX is **procedural and CPU-bound**: CPU/RAM usage is high during preview and render. This is expected and is not a bug. At idle, CPU usage returns to a low level.

- On complex comps, the preview may not be completely smooth: for the final result, use the render.
- To speed up your work: reduce the preview resolution, use the Region of Interest, and keep only the modules you need enabled.
- There is no GPU and none is needed: GPU acceleration is not available in v1.0.

 16 TROUBLESHOOTING

Troubleshooting

SYMPTOM	CHECK
The companion command is not in the Animation menu	Did you also copy <code>ScienceFXAudioCompanion.aex</code> ? Did you restart After Effects?
The effect does not appear	Check that <code>ScienceFX.aex</code> is in the correct Plug-ins folder and restart.
No audio reaction in Custom Matrix	Set at least one Map Target $\neq$ Off and Depth $\neq$ 0; check Mode = Driver and that Beat Driver keyframes exist.
No reaction even after baking	Check that <code>Audio Reactor Mode = Driver</code> and that <code>Audio Amount</code> is not 0.
I route to a module but see nothing	That module must first be enabled with its Enable checkbox.
“Strange” colors in 32 bpc	Expected HDR behavior; check the Project Settings.
High CPU/RAM	Normal during preview/render.

 17 FAQ

FAQ

Does ScienceFX work on macOS?

No. v1.0 is Windows only; there is no macOS build.

Do I need a powerful GPU?

No. Rendering is on the CPU; the GPU is not used.

Do I also need to install the companion?

Yes, if you want the Audio Reactor in Driver mode. The effect works on its own, but the companion is what generates the Beat Driver keyframes.

Does `All` use the Custom Matrix?

No. `All` is an internal global macro and does not touch the Custom Matrix. The matrix only counts with Audio Routing = `Custom Matrix` .

Can I use two audio tracks?

Yes: the companion works on the **composition's audio mix**, so multiple tracks are combined automatically.

What happens if there is no audio in the comp?

The bake finds no material to analyze and does not produce a useful envelope. Add at least one audio track to the composition before baking.

Is ScienceFX “scientifically accurate”?

ScienceFX uses scientific and mathematical concepts as a visual/procedural engine. It is not a rigorous physical simulation.

— 18 SUPPORT AND CONTACTS

Support and contacts

For technical assistance with ScienceFX, contact Analemma Labs at [\[email protected\]](#), indicating your After Effects version, Windows version, ScienceFX version and a brief description of the issue.

NOTICE ON SCIENTIFIC AND MATHEMATICAL REFERENCES

The scientific, mathematical and historical terms used in ScienceFX (attractors, fractals, transformations, wave patterns, topological constructs, etc.) are standard descriptive names of the implemented visual models and algorithms, used solely for technical identification. ScienceFX is an independent product of Analemma Labs and is not affiliated with, endorsed or sponsored by any person, entity, institution or trademark holder associated with the names that appear in the interface or documentation. Adobe® and After Effects® are registered trademarks of Adobe Inc.; ScienceFX is an independently developed third-party plug-in built with the After Effects SDK and is not affiliated with Adobe Inc.