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LIMITATIONS

Chronos manipulates the public API provided by Unity to simulate time effects. While it works correctly in almost all cases, there are some scenarios where it is limited by what Unity exposes. After all, Chronos is simply a collection of C# scripts, and it cannot hook deeper into Unity's systems.

The following page exposes the different areas where Chronos is limited and how this may affect your usage.



Time

PAUSING AND UNPAUSING THE EDITOR

Unity uses undocumented behaviour to correct `Time.deltaTime` when pausing or unpausing the game in the editor. Because Chronos must rely on unscaled time

measurements, it cannot use these autocorrections. Therefore, it will report delta times which are capped by `Time.maximumDeltaTime` after a pause. In most scenarios, this won't be apparent.



[Forum report reference](#)

DIFFERENT TIME MEASUREMENT IN FIXED UPDATE

Chronos time measurements (i.e. `deltaTime`, `time`) will not return their fixed equivalent (resp. `fixedDeltaTime`, `fixedTime`) in the `FixedUpdate` function, because Chronos cannot guarantee script execution order. However, you can still manually use these measurements.



Animation

RECORDING LOSS ON FORWARD

If you rewind an animator then let time flow forward, all of its previous recording will be reset. This is due to how Unity's animator recording methods are built, where no caching or export is possible. There seems to be no alternative at the moment.

MEMORY LEAK

There appears to be a memory leak in the circular buffer allocation by Unity's recording methods.



[Bug report reference](#)



Particles



These limitations only affect **rewindable** particle systems. Non-rewindable particle systems work without any limitation.

STUTTER ON LOW TIME SCALES

At extremely low speeds or time scales (approx. < 0.25), particle systems will appear to stutter. This is due to a bug in Unity's particle simulation method.



[Bug report reference](#)

FORCED LOCAL SIMULATION SPACE

Because Chronos has to use manual resimulation of particle systems to enable rewinding, the simulation space is always updated and therefore local. There seems to be no workaround at the moment.

NO PARTICLE COLLISION DETECTION

Likewise, when manually simulating particles, collision events never get triggered. It is unsure whether this is intended behaviour or a bug for Unity, but there seems to be no workaround at the moment.



Physics

HIGH-SPEED OBJECTS PASS THROUGH AREA CLOCKS

High-speed objects (e.g. bullets) do not trigger Unity collisions fast enough, and may therefore bypass the colliders used by area clocks. Custom raycasting must be used for such situations.

SMALL DISCREPANCIES IN TIMES AND POSITIONS

For an unknown reason, there seems to be small discrepancies in physics simulations at time scales other than 1. This may be due to unexposed non-deterministic rigidbody parameters, or simply an unreported error in Chronos. This bug is currently under evaluation.



[Forum report reference](#)