Some like it hot: scalaron heals Higgs inflation, but does not cool it

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Strong coupling in Higgs inflation at high energies hinders a joint description of inflation, reheating and low-energy dynamics. The situation may be improved with a proper UV completion of the model. A well-defined self-consistent way is to introduce an R^2-term into the action. In this modified model the strong coupling scale returns back to the Planck scale, which justifies the use of the perturbative methods in studies of the model dynamics after inflation. We investigate the reheating of the post-inflationary Universe, which involves two highly anharmonic oscillators strongly interacting with each other: homogeneous Higgs field and scalaron. We observe that in interesting regions of model parameter space these oscillations make longitudinal components of the weak gauge bosons tachyonic, triggering instant preheating at timescales much shorter than the Hubble time. The weak gauge bosons are heavy and decay promptly into light Standard Model particles, ensuring the onset of the radiation domination era right after inflation.