Constraining type I X-ray burst models

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Type I X-ray bursts are powerful thermonuclear explosions ignited in the envelope of accreting neutron stars. Fast (p,γ) and (α,p) reactions quickly drive the reaction flow towards the proton dripline before decaying back via slow β^+ and EC decays.
Since the energy generation is mainly driven by nuclear reactions and decays, type I X-ray burst models still suffer from uncertain reaction rates. Recently, it has been shown that only a few single reactions contribute significantly to the overall uncertainty in the modelling of the main observable of this event: the X-ray luminosity light curve. In order to extract astrophysical parameters of the neutron star, however, uncertainties in the light curve modelling urgently need to be minimized.

Since many of the important reactions are located at or close to the proton dripline, measurements are very challenging and require complicated setups utilizing radioactive ion facilities. In almost all cases, it is impossible to measure the desired reaction directly. To overcome this problem, new techniques and upgraded setups are combined giving access to reaction studies so far unreachable.
In this contribution, some selected recent reaction and mass measurements for the rp process will be presented. Updated results on the important ^{23}Al(p,γ)^{24}Si reaction will be shown utilizing a new measurement technique. Also, some open remaining questions will be discussed.