Keyboard interaction for ThermoBounce chemical kinetics simulation

key	meaning	initial state
b	go back from yellow or green to red state button	not applicable; one time action
c	toggle random velocities	on
d	toggle copying of temperature jumps	off
e	toggle top and front eye icons	on
f	reset viewing transformation to the identity	identity
g	advance sphere motion one frame if stopped	not applicable; one time action
i	toggle infinite vs. finite room ceiling	infinite
j	show no, just current, or all temperature jump arrows	none
m	decrease shutter open fraction of frame for blur	1
o	toggle orthogonal vs. perspective viewing	perspective
p	increase shutter open fraction of frame for blur	1
q	toggle check sphere penetration for debugging	off
r	toggle random positions	on
s	toggle sphere collisions	on
t	toggle top vs. side view	side
u	toggle uniform vs. exponentially decreasing y	exponential
v	toggle stop sphere motion	off
y	toggle rotation only about the Y axis	on
w	toggle separate room temperature effects	on

The shutter open time is analogous to the rotating shutter fraction in a live-action film movie camera, which is normally 0.5 or less, but I use 1 to make the blur segments connect without gaps. Values > 1 are also OK. Typing the f key will reset the view back to the initial side view, canceling rotation, translation, and orthogonal viewing. The decrease in the density of initial particles as a negative exponential in y is similar to the exponential decrease of atmospheric density with height above sea level. It is consistent with the exponential factor of the Maxwell_Boltzmann distribution, which decreases exponentially with the kinetic energy of the molecules, since the gravitational potential energy is converted to kinetic energy as the spheres fall. But you can make the distribution constant per unit volume by typing u. The separate room temperature setting computes the average particle temperature separately for each room, for the decision of whether to slow down or speed up the velocity when a particle hits a room wall, floor, or ceiling, in order to make the temperature of the gas of particles move towards the desired temperature set by the user.