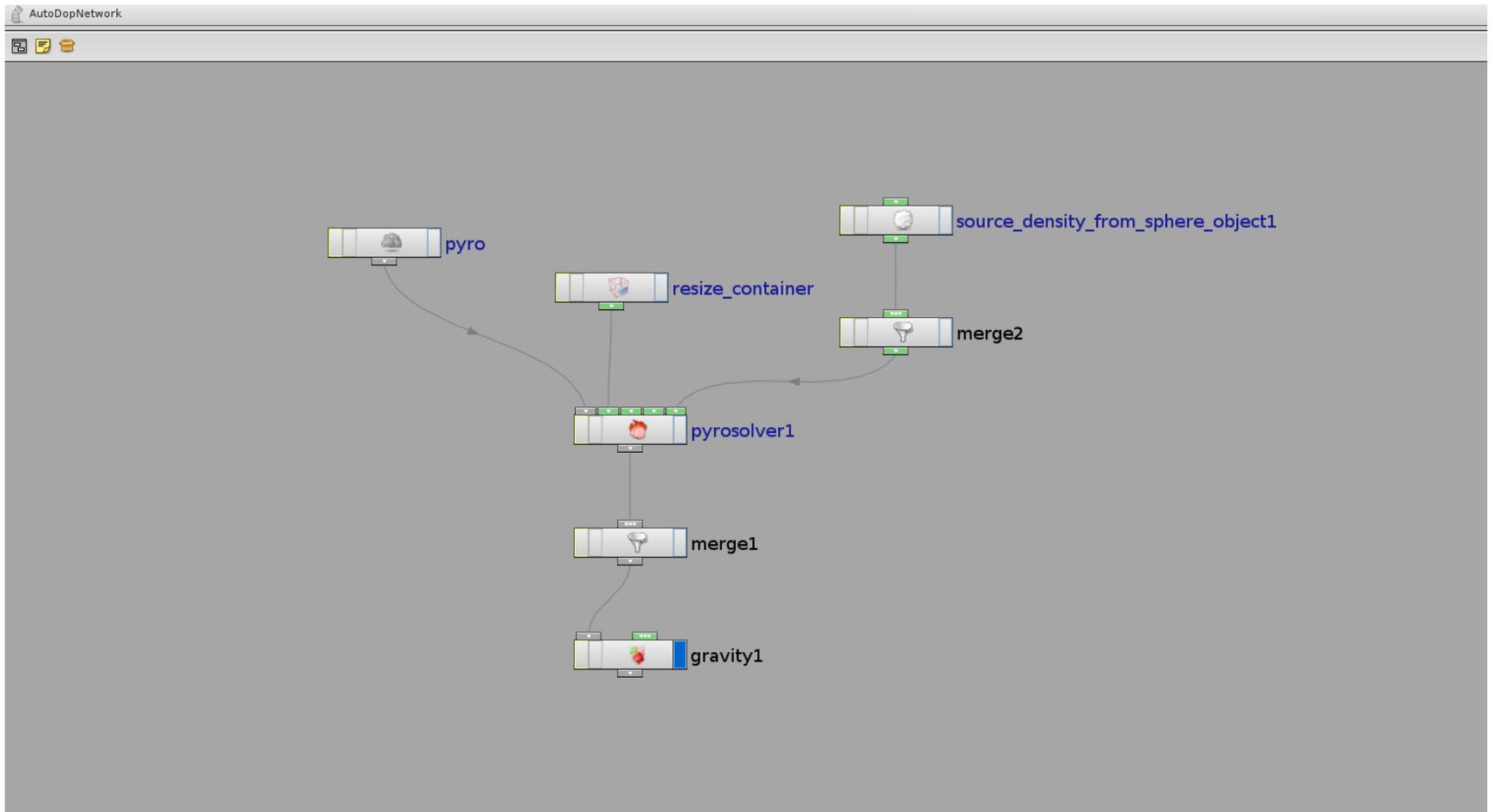
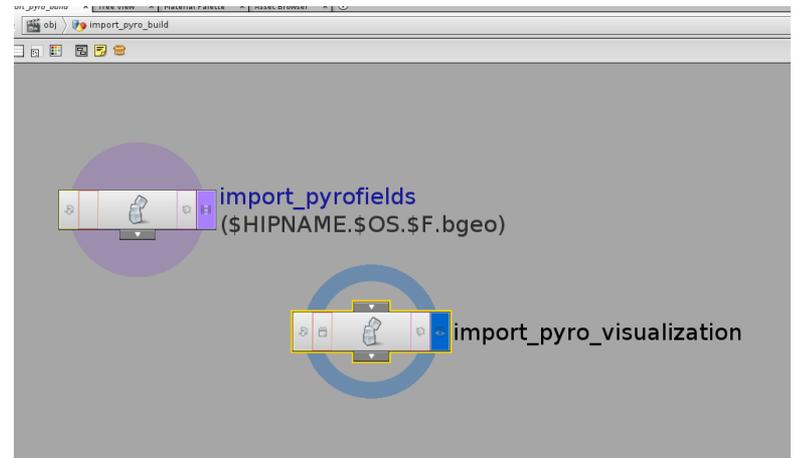
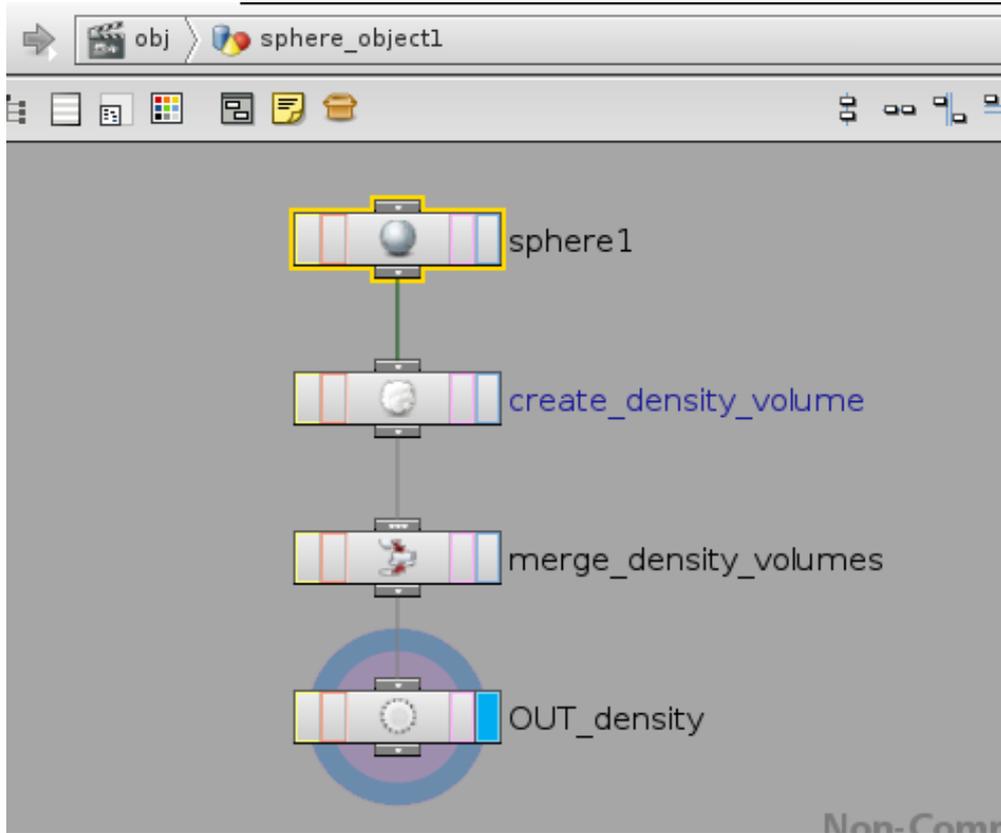


Pyro

Anatomy of a Pyro dopnet



source object and render object



Combustion Process

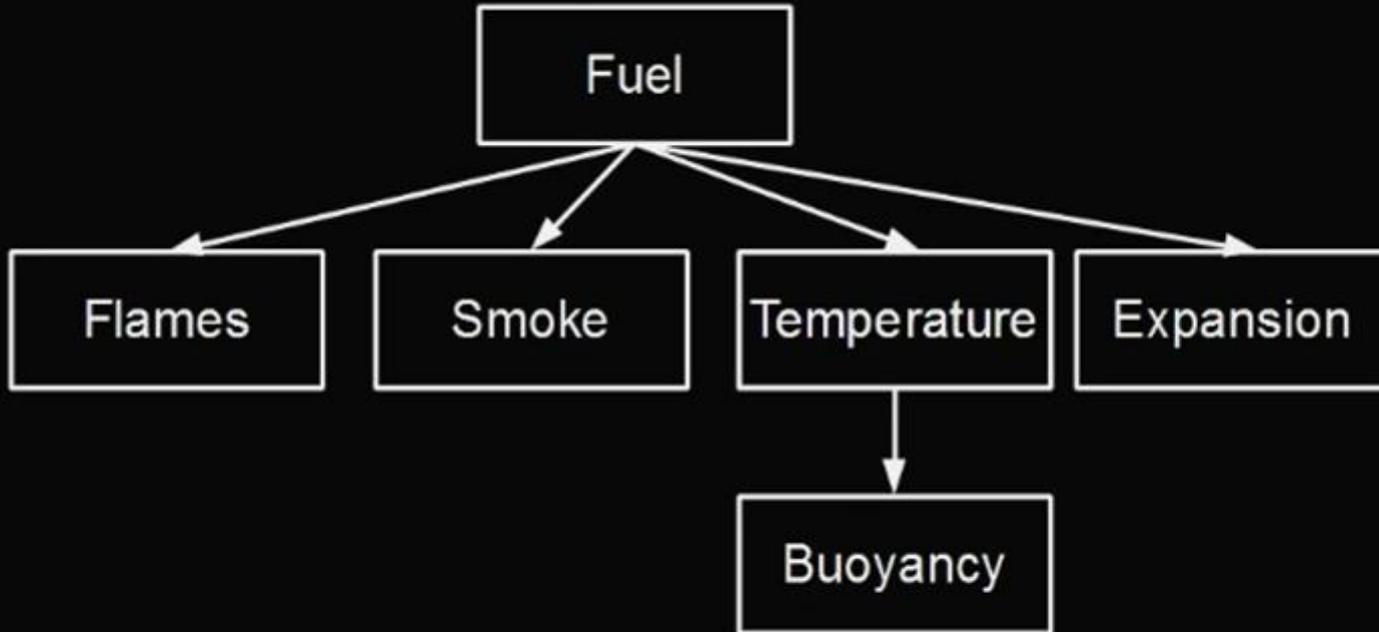


Diagram from Peter Quint's H12 Pyro part 1

Equivalents in Houdini

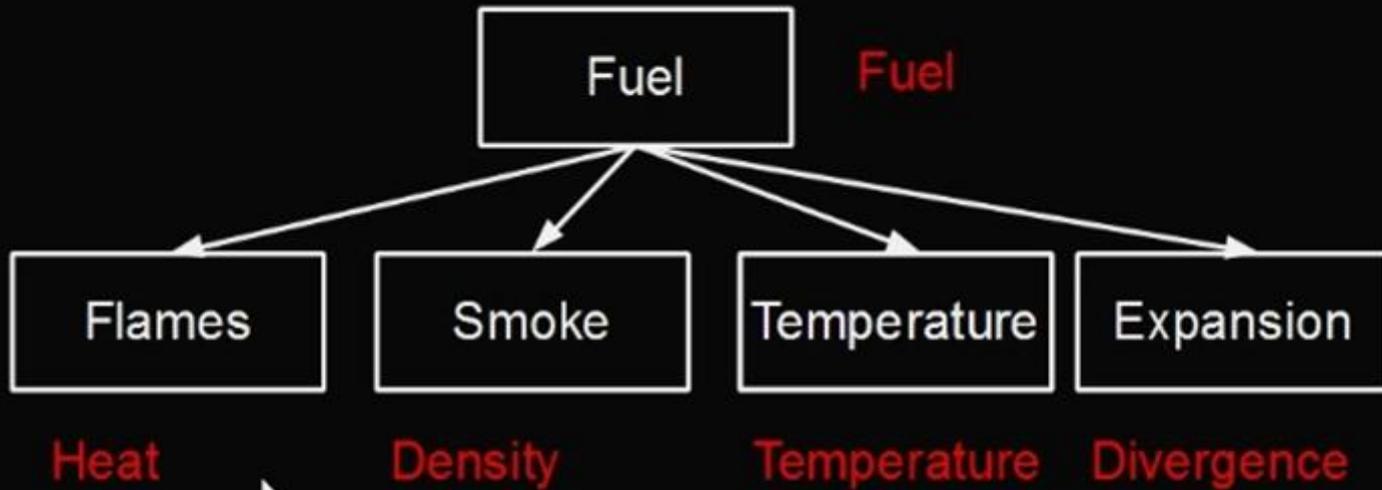


Diagram from Peter Quint's H12 Pyro part 1

Additional Burn (calculated each step)

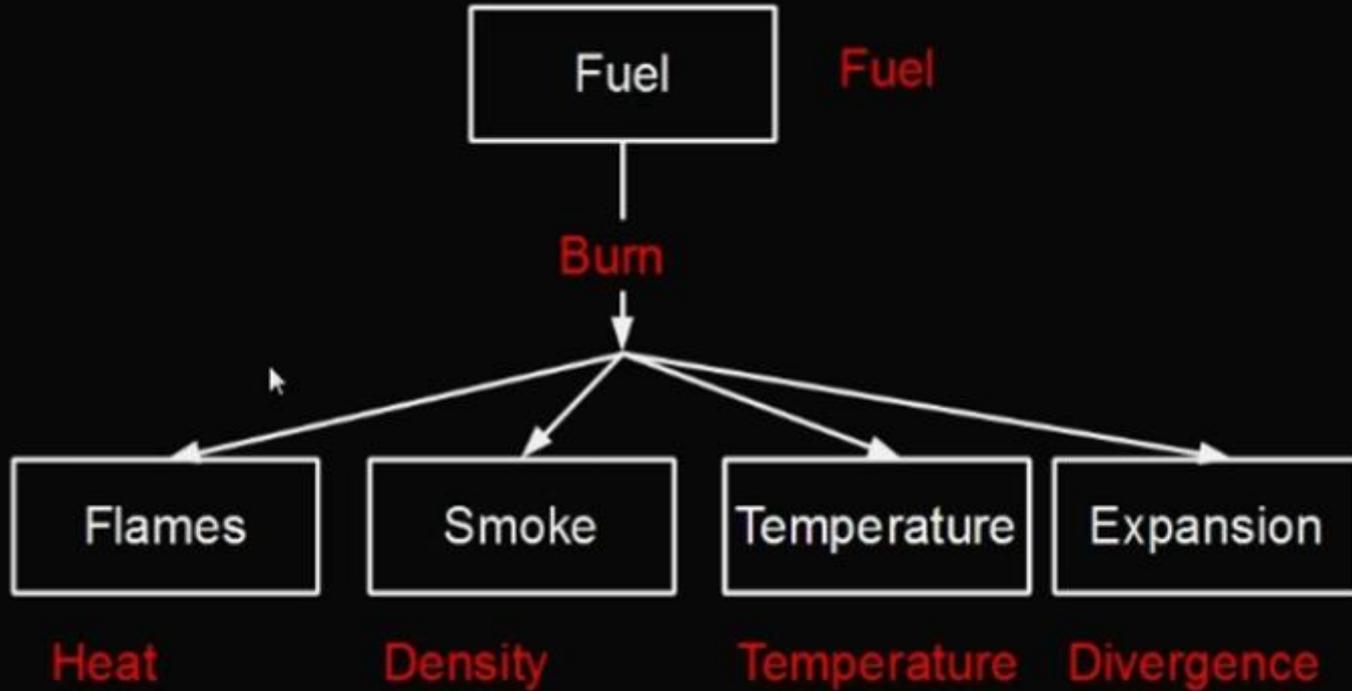


Diagram from Peter Quint's H12 Pyro part 1

Process

The Main Variables

- Fuel : what you burn
- Temperature : influences whether the fuel will ignite, and how fast your smoke and flames will rise
- Burn : a temporary field representing the process of converting fuel into smoke and flames
- Density : smoke, but you also need to have it to render flames correctly
- Heat : your flames
- Divergence : whether your smoke and flames expand outwards

From Peter Quint's H12 Pyro part 1

The Combustion Process

Where temperature > ignition

Set burn = fuel * burnrate

Generate new smoke by burn * sootrate

Set heat = to the maximum of heat, burn

Increase divergence by burn * gas_release * burn_influence

Increase temperature by burn * heatoutput *
temp_burn_influence

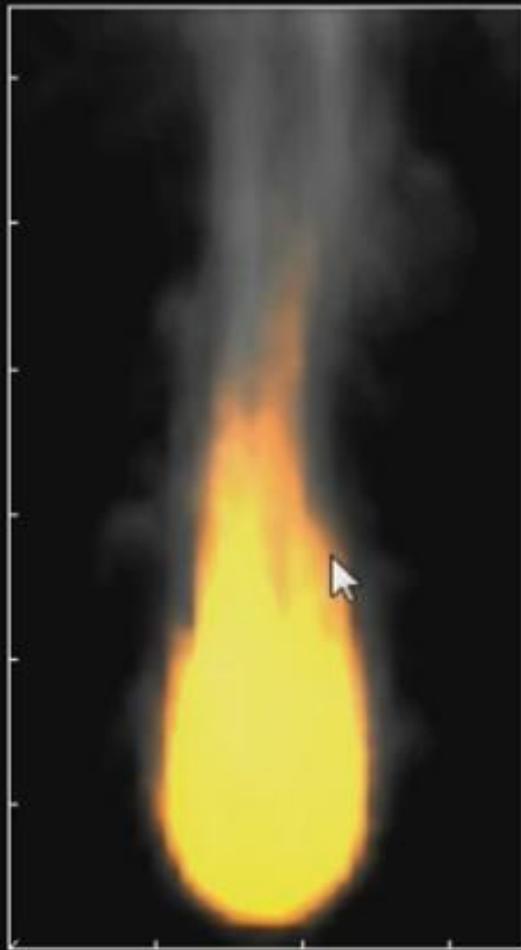
Reduce fuel by burn * (1 - fuelinefficiency)

From Peter Quint's H12 Pyro part 1

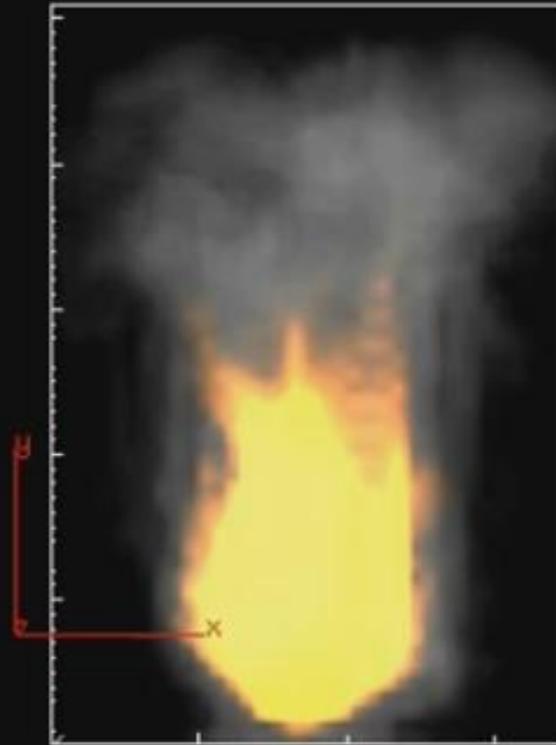
- Smoke (=density) depends on
Fuel, Burn Rate, Smoke Amount
- Flames (=heat) depends on
Fuel, Burn Rate
- Temperature (and therefore how fast things
rise) depends on
Fuel, Burn Rate, Flame Contribution, Burn
Contribution
- Expansion (=divergence) depends on
Fuel, Burn Rate, Gas Released

From Peter Quint's H12 Pyro part 1

Simulation Tab – Buoyancy Lift



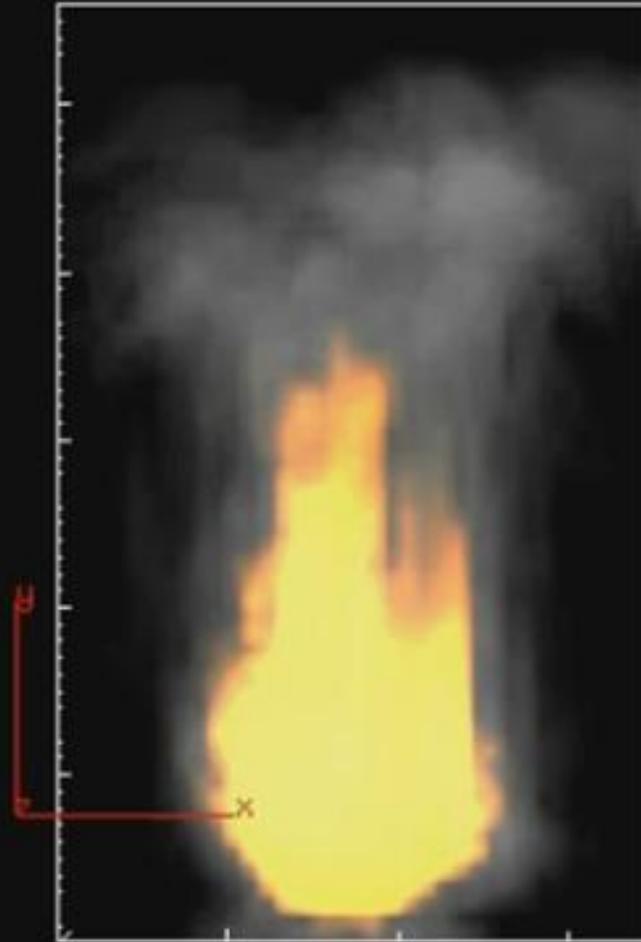
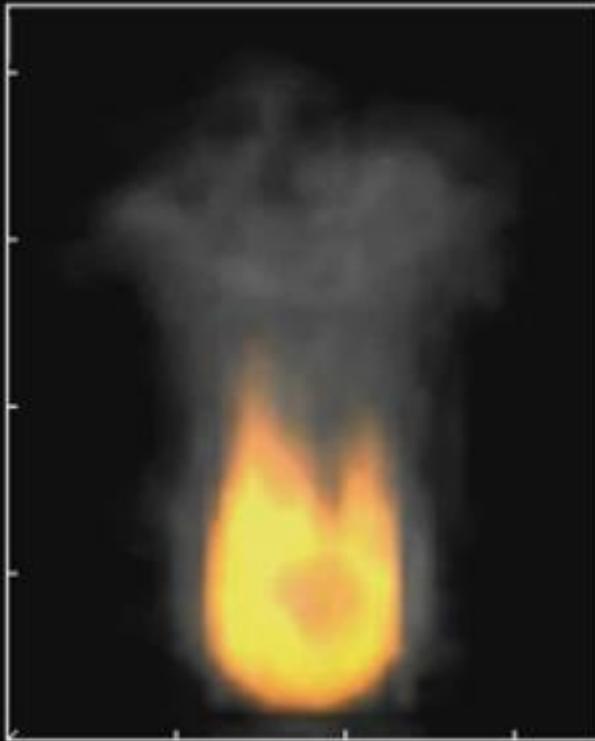
Buoyancy Lift 15 versus 4.5



From Peter Quint's H12 Pyro part 1

Combustion tab – Burn Rate

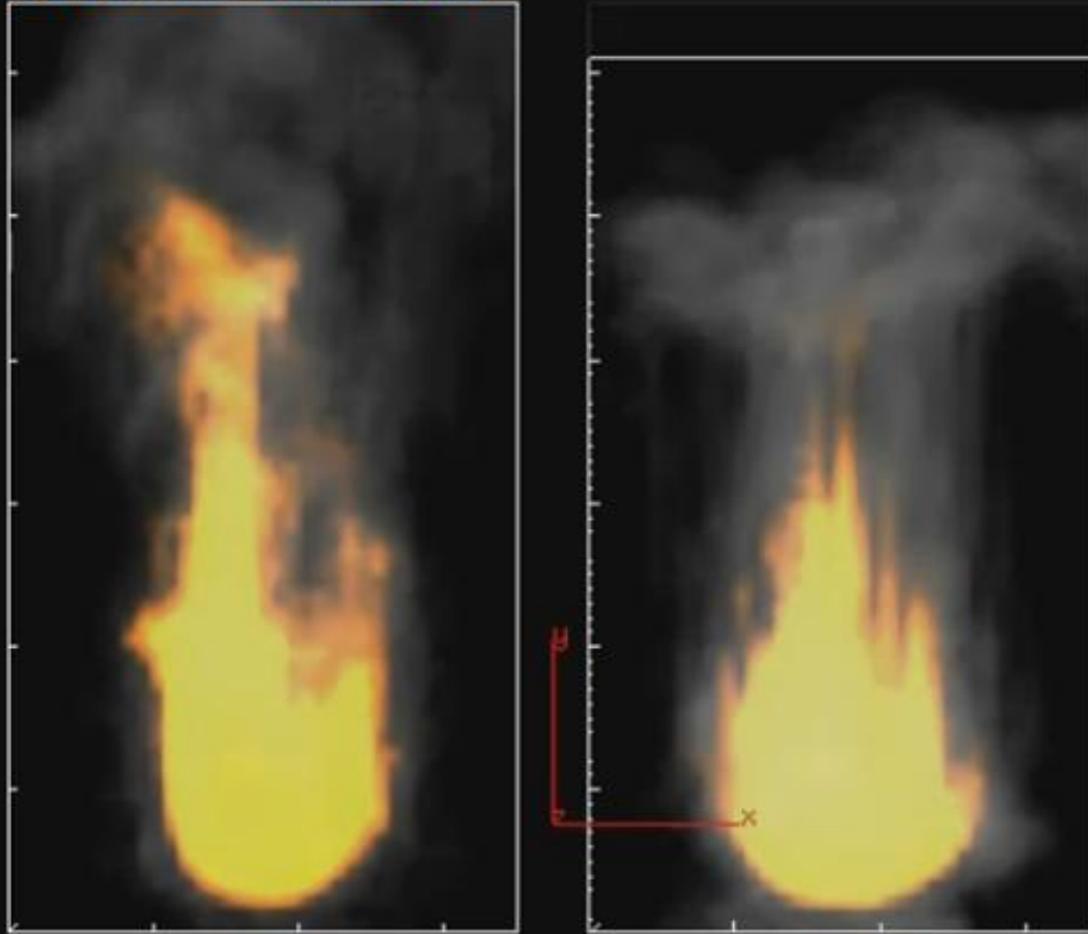
Burn rate .3 versus .9
pyrosolver/Combustion



From Peter Quint's H12 Pyro part 1

Combustion tab – Temperature Output

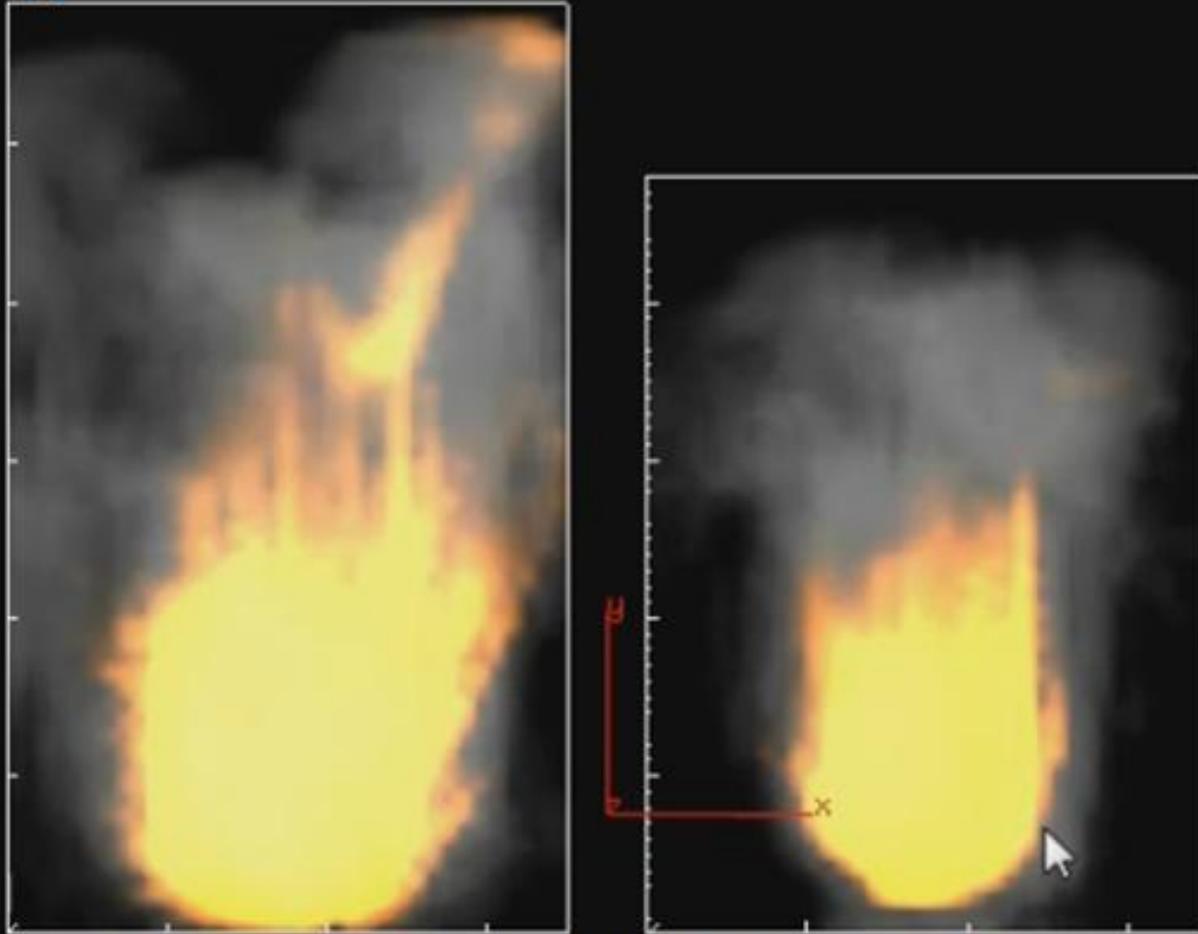
Temperature Output 4 versus .5
pyrosolver/Combustion



From Peter Quint's H12 Pyro part 1

Combustion tab – Gas Released

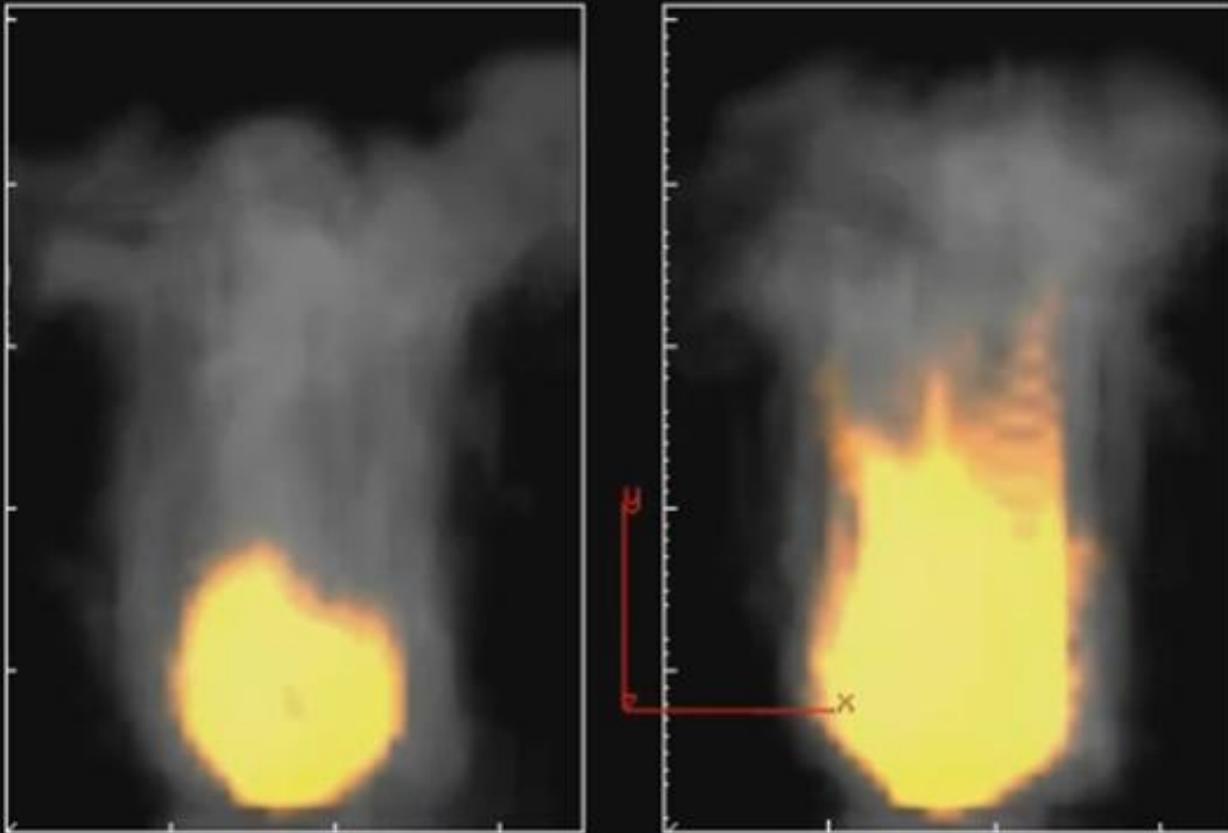
Gas Released 30 versus 14
pyrosolver/Combustion



From Peter Quint's H12 Pyro part 1

Combustion tab/Flames – Flame Height

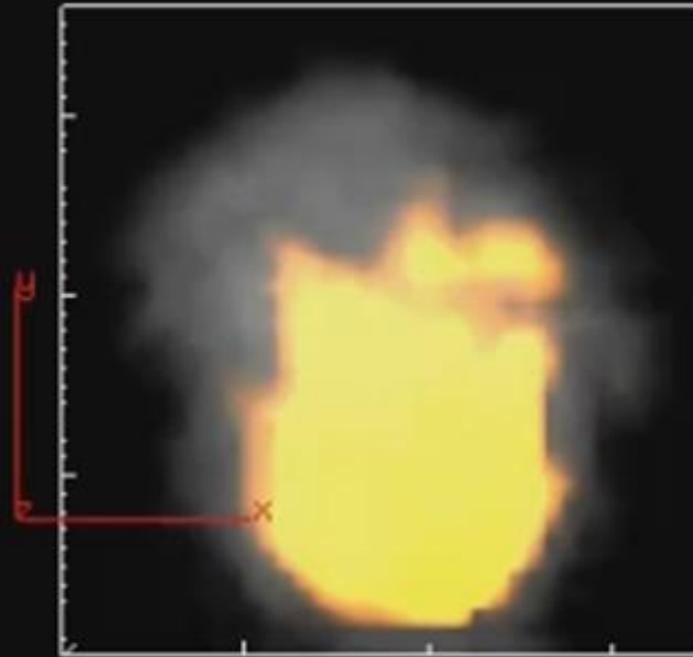
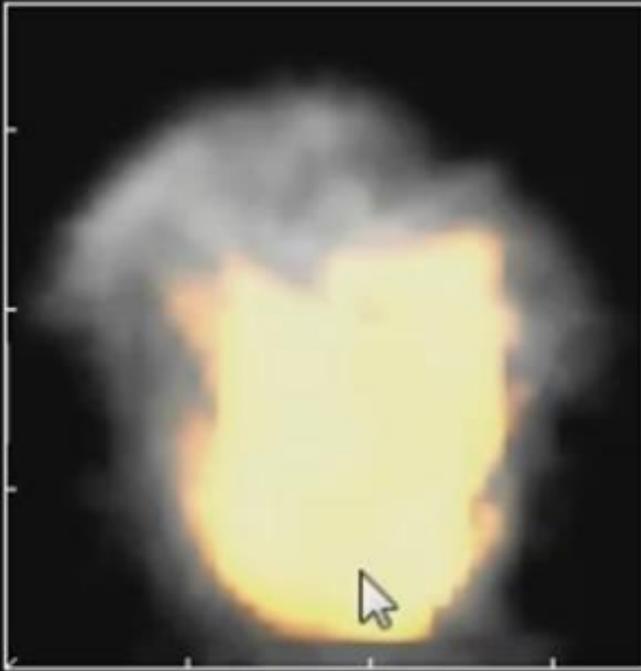
Flame height .5 versus 3.5
pyrosolver/Combustion/Flames (finer control)



From Peter Quint's H12 Pyro part 1

Combustion tab / Smoke – Heat Cutoff

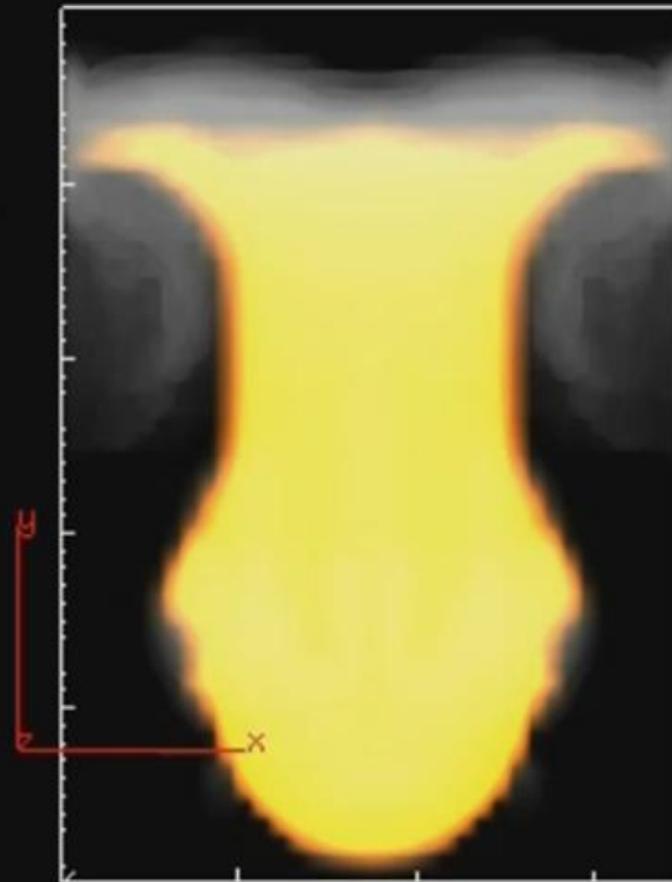
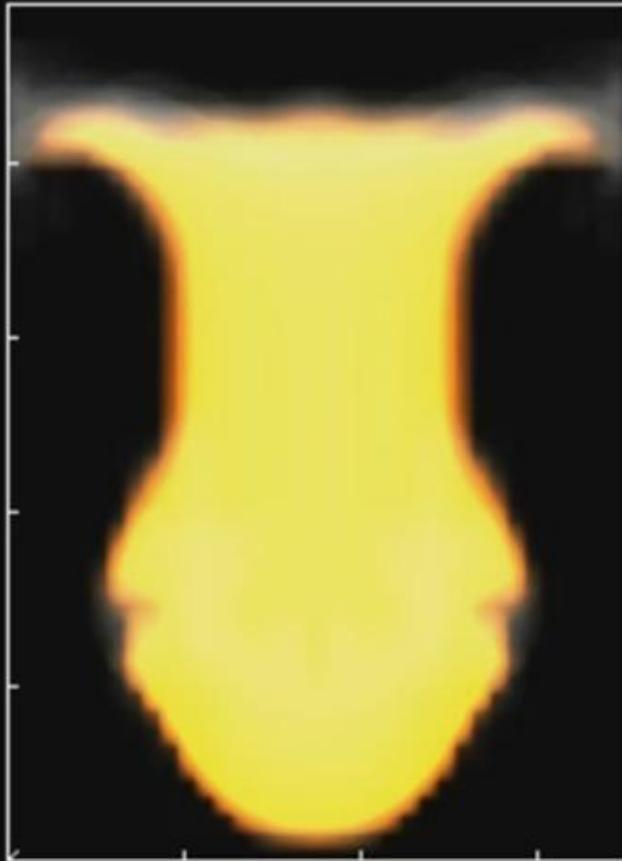
Heat Cutoff .8 versus .2
pyrosolver/Combustion/Smoke (finer control)
= higher values, more smoke



From Peter Quint's H12 Pyro part 1

Shape tab (effect velocity) – Dissipation (evaporates smoke)

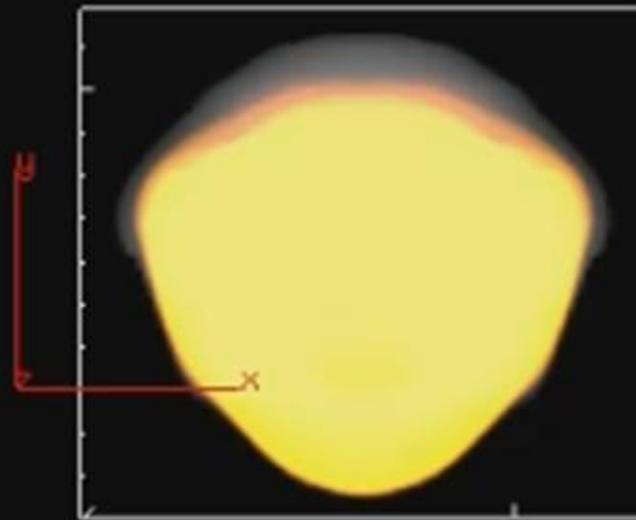
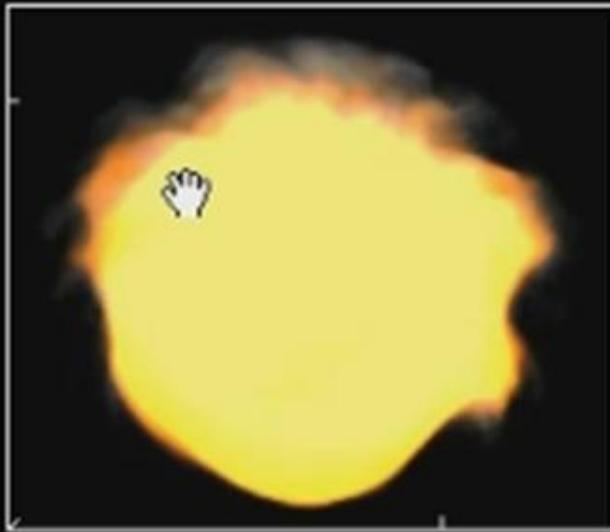
pyrosolver / Shape / Dissipation .9 versus .1



From Peter Quint's Pyro H12 part II

Shape tab (effect velocity) – Disturbance (adds detailed noise)

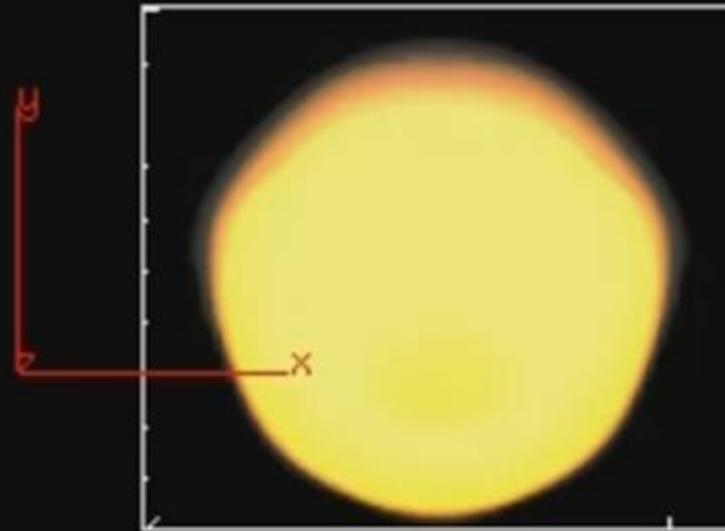
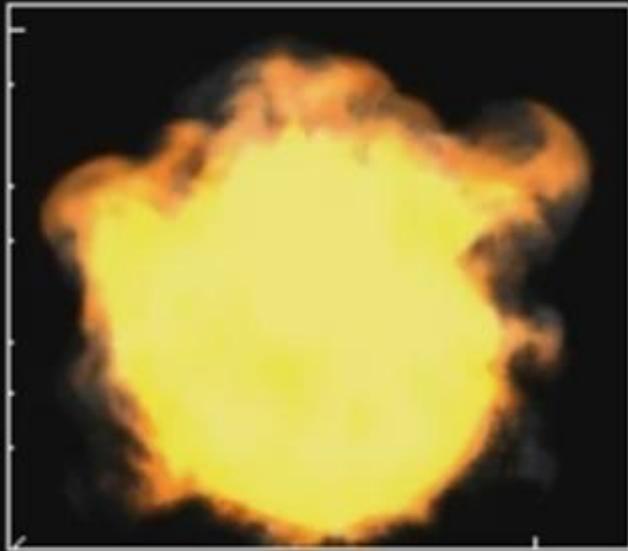
pyrosolver / Shape / Disturbance .4 versus none
final details appear on the edge of flame/smoke
(division size on pyro node is .05 instead of .2 to
see the details)



From Peter Quint's Pyro H12 part II

Shape tab (effect velocity) – Shredding (adds detailed noise)

pyrosolver / Shape / Shredding .6 versus none



From Peter Quint's Pyro H12 part II

more controls – but you get the idea ...

Let's talk about the shader ... there are videos about the shader on the forums

Most importantly – you can use the OpenGL display to adjust your shader and then write that data into the shader.

If you have the Multi field displayed – you can use the tab controls for both

- Smoke (diffuse component) which uses density and color controls
- Emission (fire) which uses heat (the extent of the glow) with the color controls as well

On the pyro shader in the shop under the **Utils** tab

