

# DIP Documentation

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# Parameters

## Node types

	Declaration
	Definition
	Declaration / Modification
	Definition / Modification
	Modification

## Parameter list

Property name	#	#	#	#	#
<a href="#">box.geometry</a>		1			
<a href="#">box.size.vy</a>		1			
<a href="#">box.size.x</a>	1				1
<a href="#">box.size.y</a>	1	1		1	
<a href="#">box.size.z</a>		1			
<a href="#">cells.densities</a>		1			
<a href="#">cells.sizes</a>		1			
<a href="#">cells.temperatures</a>		1			
<a href="#">cfl_factor</a>		1			
<a href="#">max_vare</a>		1			
<a href="#">max_vari</a>		1			
<a href="#">modules.heating</a>	1				1
<a href="#">modules.hydrodynamics</a>		1			
<a href="#">modules.radiation</a>	1				1
<a href="#">runtime.t_max</a>	1				1
<a href="#">runtime.timestep</a>	1				1
<a href="#">simulation.directory</a>	1				
<a href="#">simulation.name</a>		1			
<a href="#">simulation.precision</a>		1			

## Parameter nodes

### box.geometry

PDF_FILE1:20		uint16
Value:	3	
Injection:	{settings?box.geometry}	
Options:	1, 2, 3	
Description:	Type of grid geometry	

### box.size.vy

PDF_FILE1:38		float64
Value:	23.000	
Default Unit:	km/s	

### box.size.x

PDF_FILE1:27		float128
Default Unit:	cm	
Condition:	{?} > 0	
Description:	Box size in X direction	
settings:8		mod
Value:	10	
Default Unit:	nm	

### box.size.y

PDF_FILE1:32		float64
Default Unit:	cm	
Options:	3.0 cm, 4.0 cm	
Description:	Box size in Y direction	
PDF_FILE1:37		float64
Value:	34.000	
Default Unit:	au	
settings:9		mod
Value:	3e7	
Default Unit:	nm	

### box.size.z

PDF_FILE1:43		constant float64
Value:	23.000	
Default Unit:	cm	
Options:	10.0 m, 20.0 cm, 23.0 cm, 26.0 cm	

Description:	Box size in Z direction
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#### cells.densities

cells:1	float64
Value:	[0.0, 1.0, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0]
Default Unit:	km/s

#### cells.sizes

cells:2	int32
Value:	[10, 11, 12, 13, 14, 15, 16, 17, 18, 19]
Default Unit:	cm

#### cells.temperatures

cells:3	float64
Value:	[20.0, 21.0, 22.0, 23.0, 24.0, 25.0, 26.0, 27.0, 28.0, 29.0]
Default Unit:	K

#### cfl\_factor

PDF_STRING1:4	float64
Value:	0.700

#### max\_vare

PDF_STRING1:5	float64
Value:	0.200

#### max\_vari

PDF_STRING1:6	float64
Value:	0.200

#### modules.heating

PDF_FILE1:57	bool
Tags:	preprocessor
Description:	Switch on heating module
settings:12	mod
Value:	false

#### modules.hydrodynamics

PDF_FILE1:54	bool
Value:	true
Tags:	preprocessor
Description:	Switch on hydrodynamics module

#### modules.radiation

PDF_FILE1:60		bool
Tags:	preprocessor	
Description:	Switch on radiation module	
settings:13		mod
Value:	true	

#### runtime.t\_max

PDF_FILE1:11		float64
Default Unit:	s	
Condition:	{?} > 0	
Description:	Maximum simulation time	
settings:2		mod
Value:	10	
Default Unit:	ns	

#### runtime.timestep

PDF_FILE1:14		float64
Default Unit:	s	
Condition:	{?} < {?runtime.t_max} && {?} > 0	
Description:	Simulation time step	
settings:3		mod
Value:	0.01	
Default Unit:	ns	

#### simulation.directory

PDF_FILE1:8		mod
Injection:	{pahts?simulation.directory}	

#### simulation.name

PDF_FILE1:4		str
Value:	simulation	
Format:	[a-zA-Z_-]+	

#### simulation.precision

PDF_FILE1:6		str
Value:	double	
Options:	double, float	

## Injected nodes

PDF_FILE1:8	
Request:	{pahts?simulation.directory}
Injection node:	simulation.directory
PDF_FILE1:20	
Request:	{settings?box.geometry}
Injection node:	box.geometry
From source:	settings:6

# Imports

PDF_FILE1:17		
Request:	{settings?runtime.*}	
Imported node:		From source:
runtime.t_max		settings:2
runtime.timestep		settings:3

PDF_FILE1:49		
Request:	{settings?box.size.*}	
Imported node:		From source:
box.size.x		settings:8
box.size.y		settings:9

PDF_FILE1:51		
Request:	{options?box.boundary.*}	

PDF_FILE1:64		
Request:	{settings?modules.*}	
Imported node:		From source:
modules.heating		settings:12
modules.radiation		settings:13

PDF_FILE1:67		
Request:	{cells?*}	
Imported node:		From source:
cells.densities		cells:1
cells.sizes		cells:2
cells.temperatures		cells:3

# Settings

## List of units

Name	Value	Units	Source
[velocity]	13	cm/s	<a href="#">PDF_ROOT:27</a>
[length]	1	cm	<a href="#">PDF_STRING1:1</a>
[mass]	2	g	<a href="#">PDF_STRING1:2</a>



## List of sources

PDF_ROOT	
File:	build_docs.py
PDF_STRING1	
File:	build_docs.py
Source:	<a href="#">PDF_ROOT:28</a>
1	\$unit length = 1 cm
2	\$unit mass = 2 g
3	
4	cfl_factor float = 0.7 # Courant-Friedrichs-Lewy condition
5	max_vare float = 0.2 # maximum energy change of electrons
6	max_vari float = 0.2 # maximum energy change of ions
PDF_FILE1	
File:	definitions.dip
Source:	<a href="#">PDF_ROOT:37</a>
1	\$source settings = settings.dip
2	
3	simulation
4	name str = "simulation"
5	!format "[a-zA-Z_-]+"
6	precision str = "double"
7	!options ["double","float"]
8	directory = {pahts?simulation.directory}
9	
10	runtime
11	t_max float s # mandatory
12	!condition ("{?} > 0")
13	!description "Maximum simulation time"
14	timestep float s
15	!condition ("{?} < {?runtime.t_max} && {?} > 0") # mandatory
16	!description "Simulation time step"
17	{settings?runtime.*}
18	
19	box
20	geometry uint16 = {settings?box.geometry} # mandatory
21	= 1 # linear
22	= 2 # cylindrical
23	= 3 # spherical
24	!description "Type of grid geometry"
25	
26	size
27	x float128 cm # mandatory
28	!condition ("{?} > 0")
29	!description "Box size in X direction"
30	#y float cm # first declared here
31	@case ("{?box.geometry} == 2")
32	y float cm # mandatory if geometry is non-linear
33	= 3 cm
34	= 4 cm
35	!description "Box size in Y direction"
36	@case ("{?box.geometry} == 3")
37	y float = 34 au
38	vy float = 23 km/s
39	##else
40	# y float = 3 m
41	@end
42	@case ("{?box.geometry} == 3")
43	z float = 23 cm # constant
44	= 10 m
45	!options [20,23,26] cm
46	!description "Box size in Z direction"

```

47         !constant
48     @end
49     {settings?box.size.*}
50     boundary
51     {options?box.boundary.*}
52
53     modules
54         hydrodynamics bool = true # optional
55         !description "Switch on hydrodynamics module"
56         !tags ["preprocessor"]
57         heating bool # mandatory
58         !description "Switch on heating module"
59         !tags ["preprocessor"]
60         radiation bool # mandatory
61         !description "Switch on radiation module"
62         !tags ["preprocessor"]
63
64     {settings?modules.*}
65
66     cells
67     {cells?*}

```

## cells

File:	cells.dip
Source:	<a href="#">PDF_ROOT:36</a>

```

1     densities float[10] = [0,1,2,3,4,5,6,7,8,9] km/s
2     sizes int[10] = [10,11,12,13,14,15,16,17,18,19] cm
3     temperatures float[10] = [20,21,22,23,24,25,26,27,28,29] K

```

## settings

File:	settings.dip
Source:	<a href="#">PDF_FILE1:1</a>

```

1     runtime
2         t_max = 10 ns
3         timestep = 0.01 ns
4
5     box
6         geometry = 3
7         size
8             x = 10 nm
9             y = 3e7 nm
10
11     modules
12         heating = false
13         radiation = true

```