A cartoon picture of the IDI stagnation phase: What we're doing to improve our implosions

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NISP discussion

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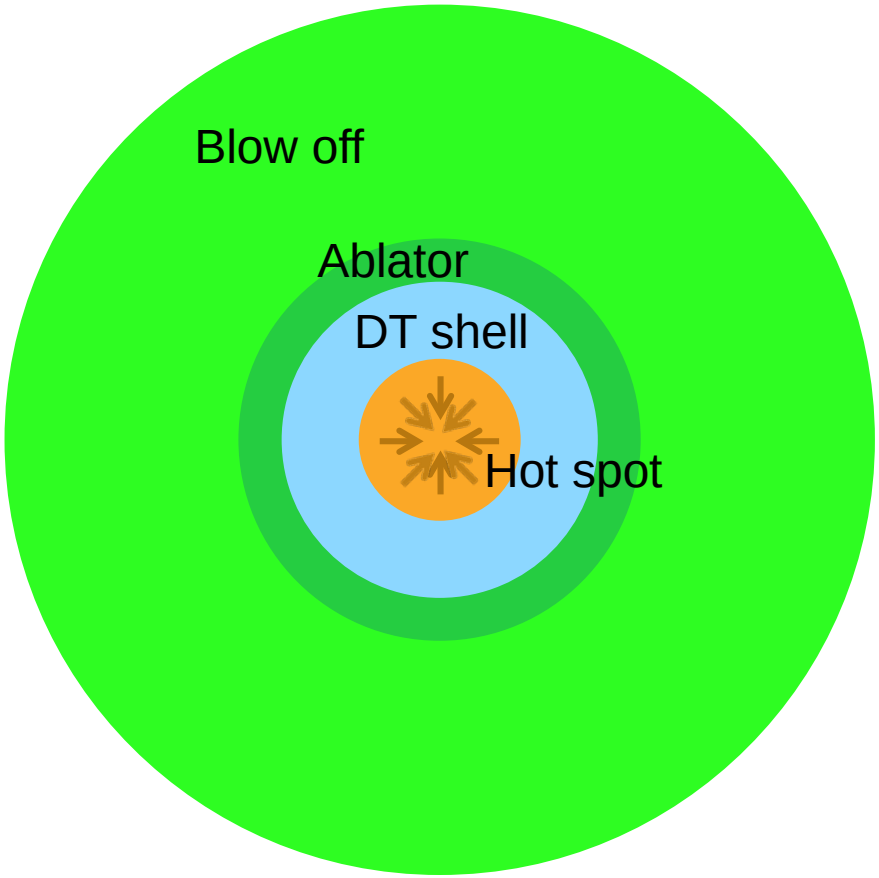
My goal today is to

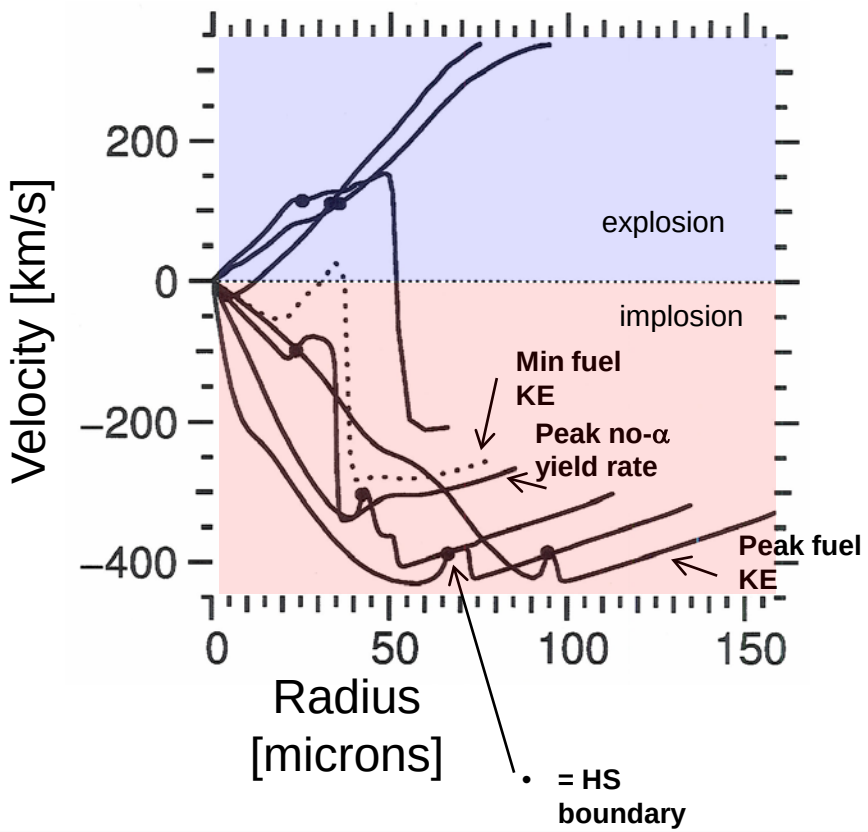
- Share a notion of “good stagnation”
- Share a picture of “poor stagnation” consistent with IDI experiments
- Spark our thinking toward our goals in this group

1. Current understanding of experiments
2. Hypotheses for discrepancies between experiments and design/modeling
3. Measurements to test the hypotheses for the discrepancies

Perfect, 1D stagnation is spherical, but never motionless



The implosion is symmetric, but it is never stagnant



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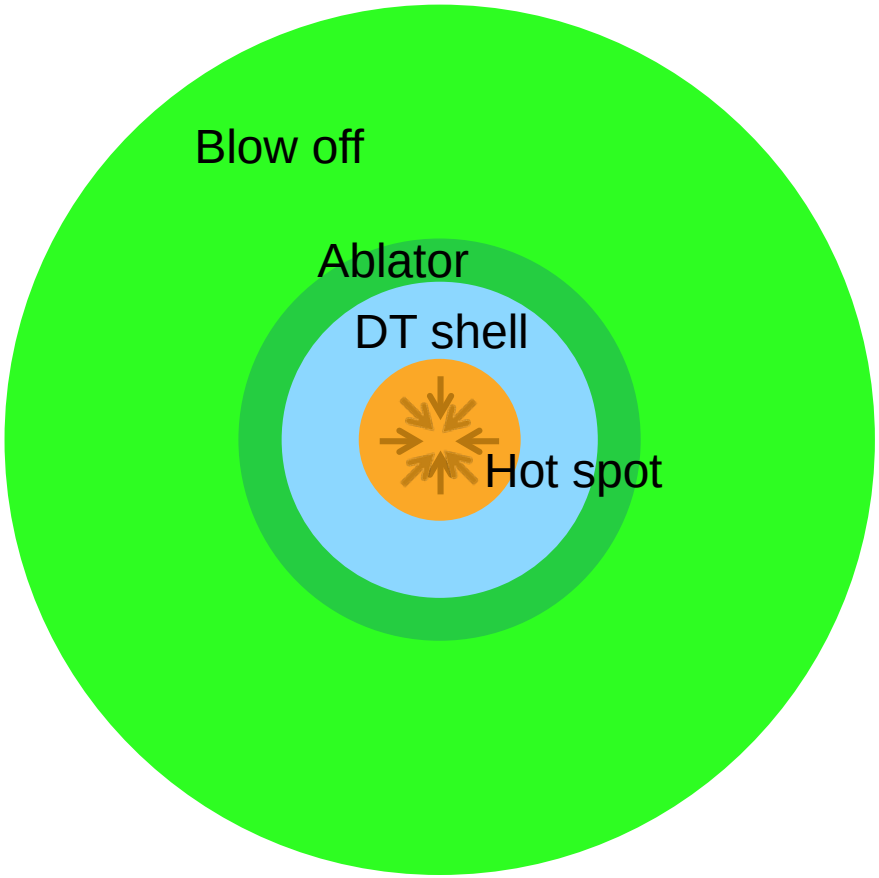

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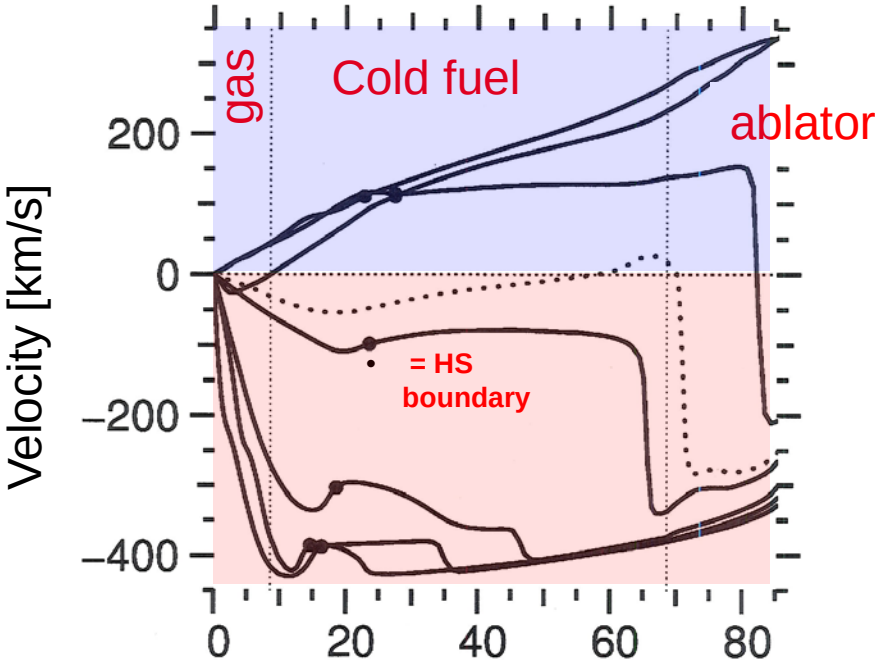
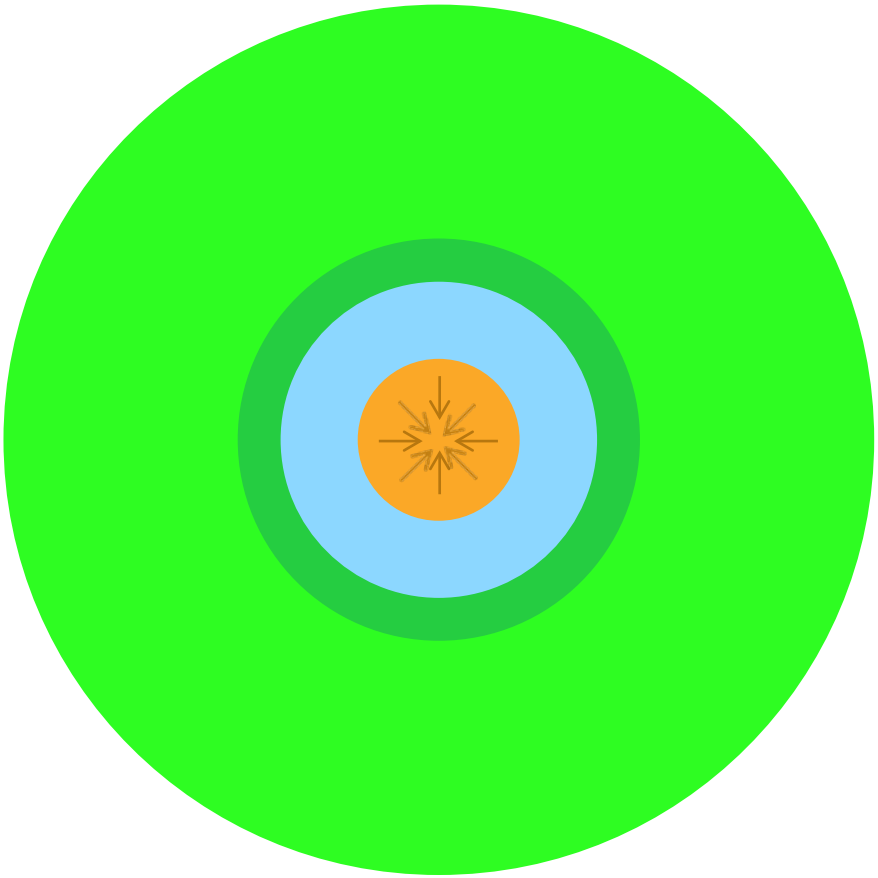
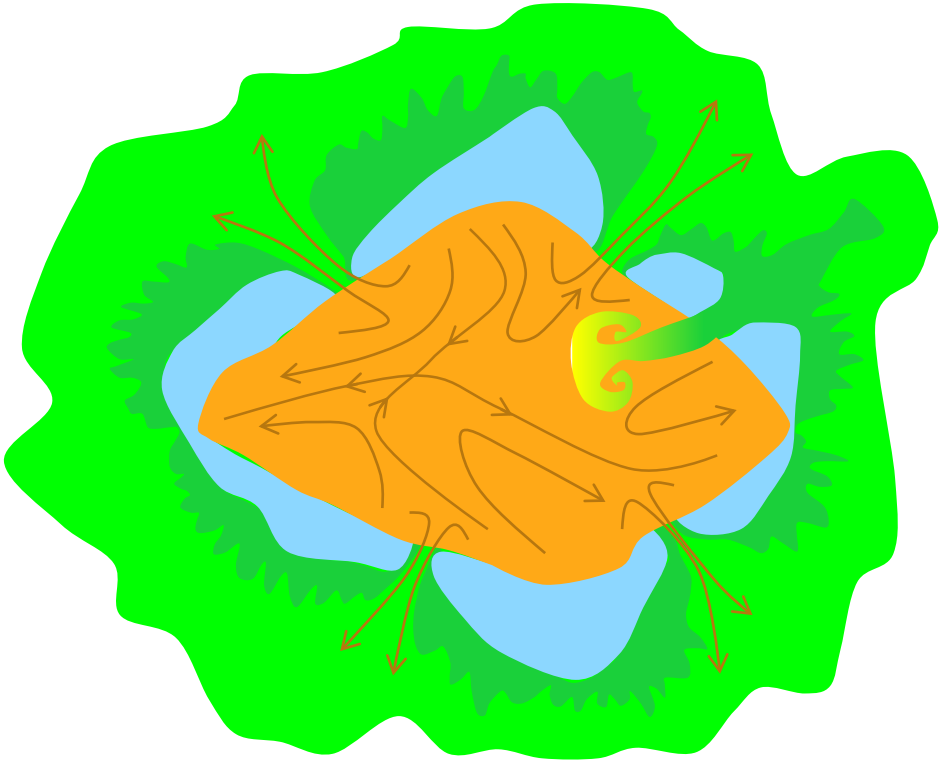


We hypothesize that our stagnation phase suffers from multiple imperfections

1D



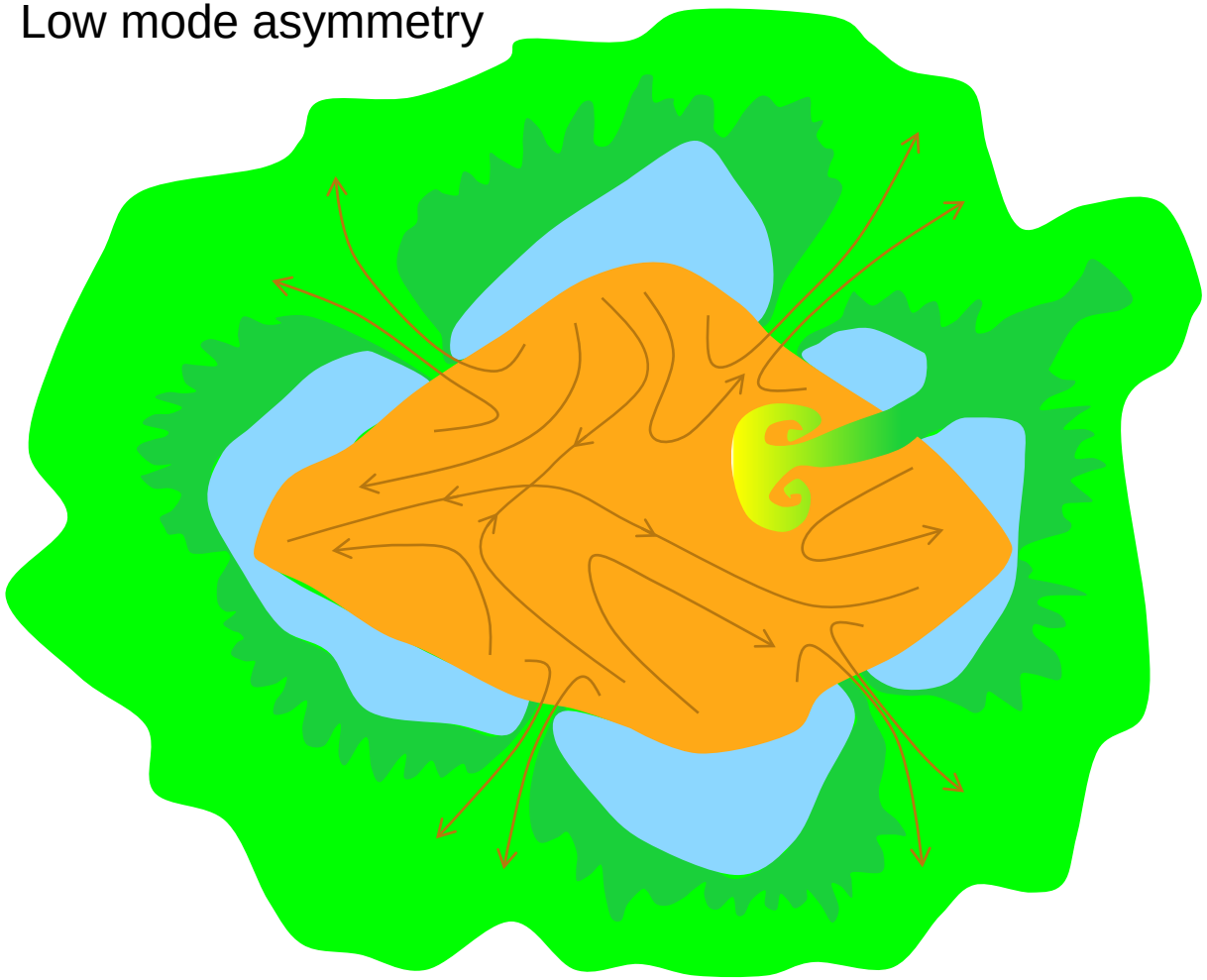
Hypothetical experimental implosion



We have hypotheses for what's affecting our implosion, but there are also gaps in our understanding

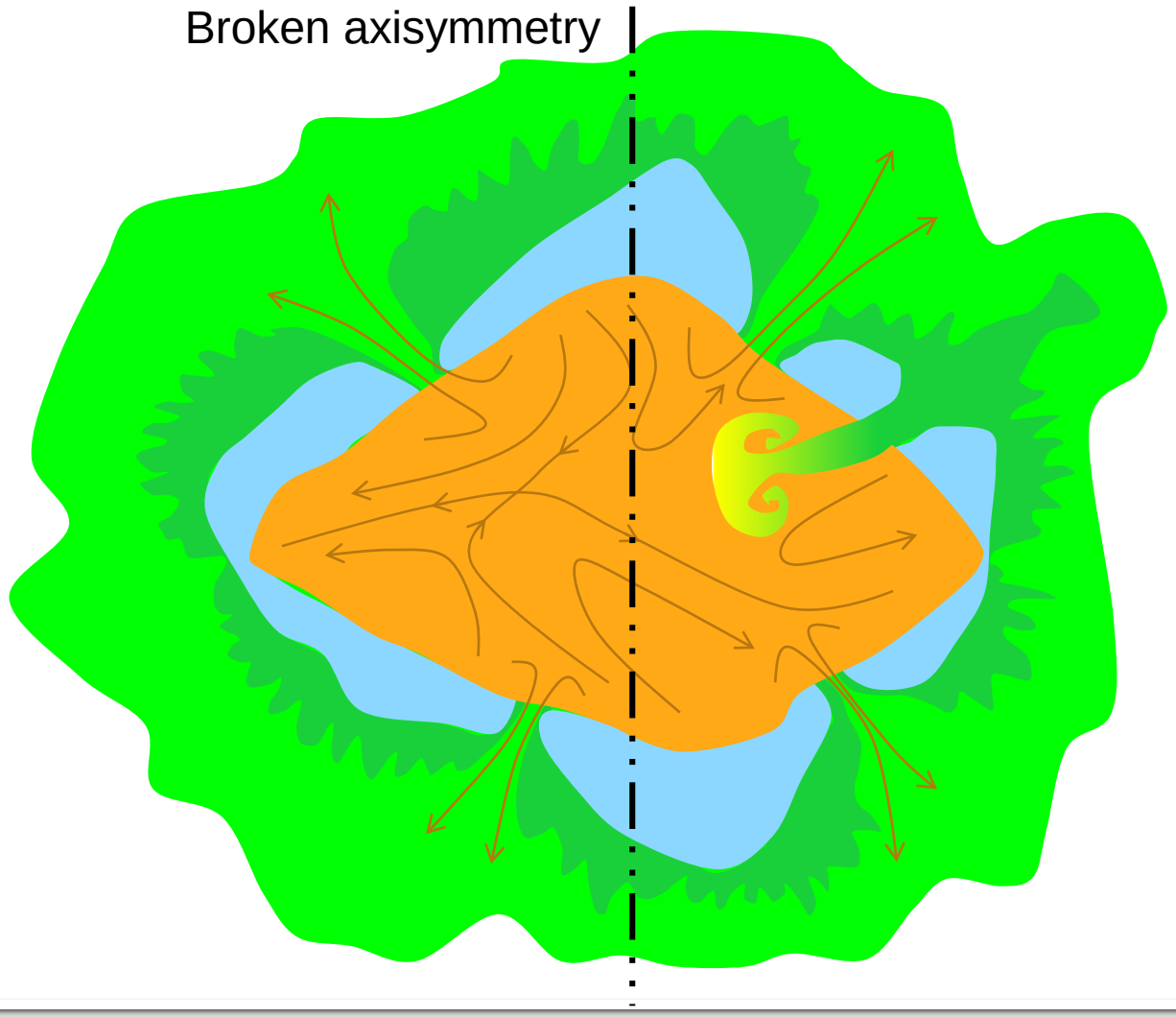
We have a list of hypothetical imperfections that we aim to correct

Low mode asymmetry



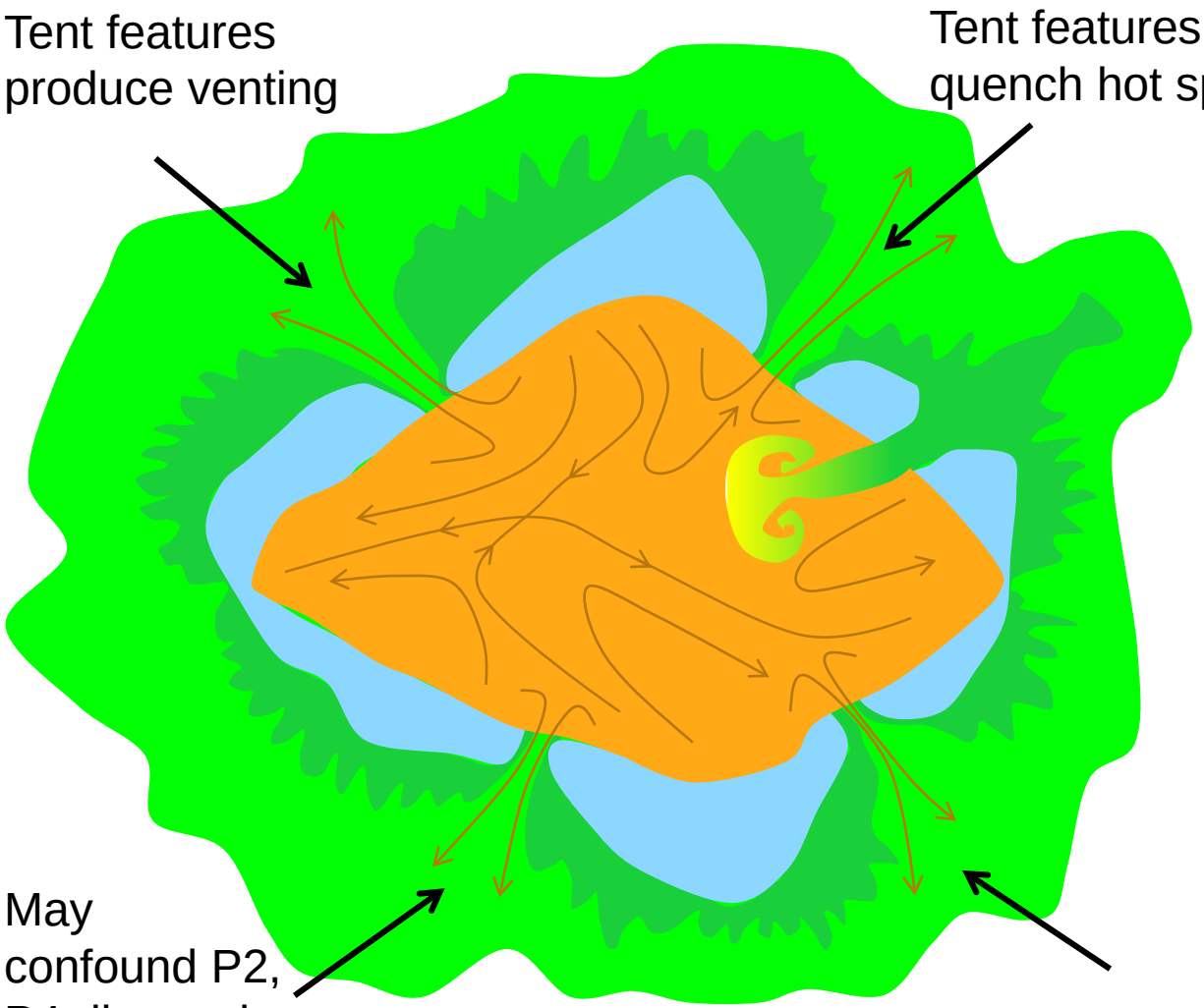
Symptoms of imperfect stagnation
P2, P4

We have a list of hypothetical imperfections that we aim to correct



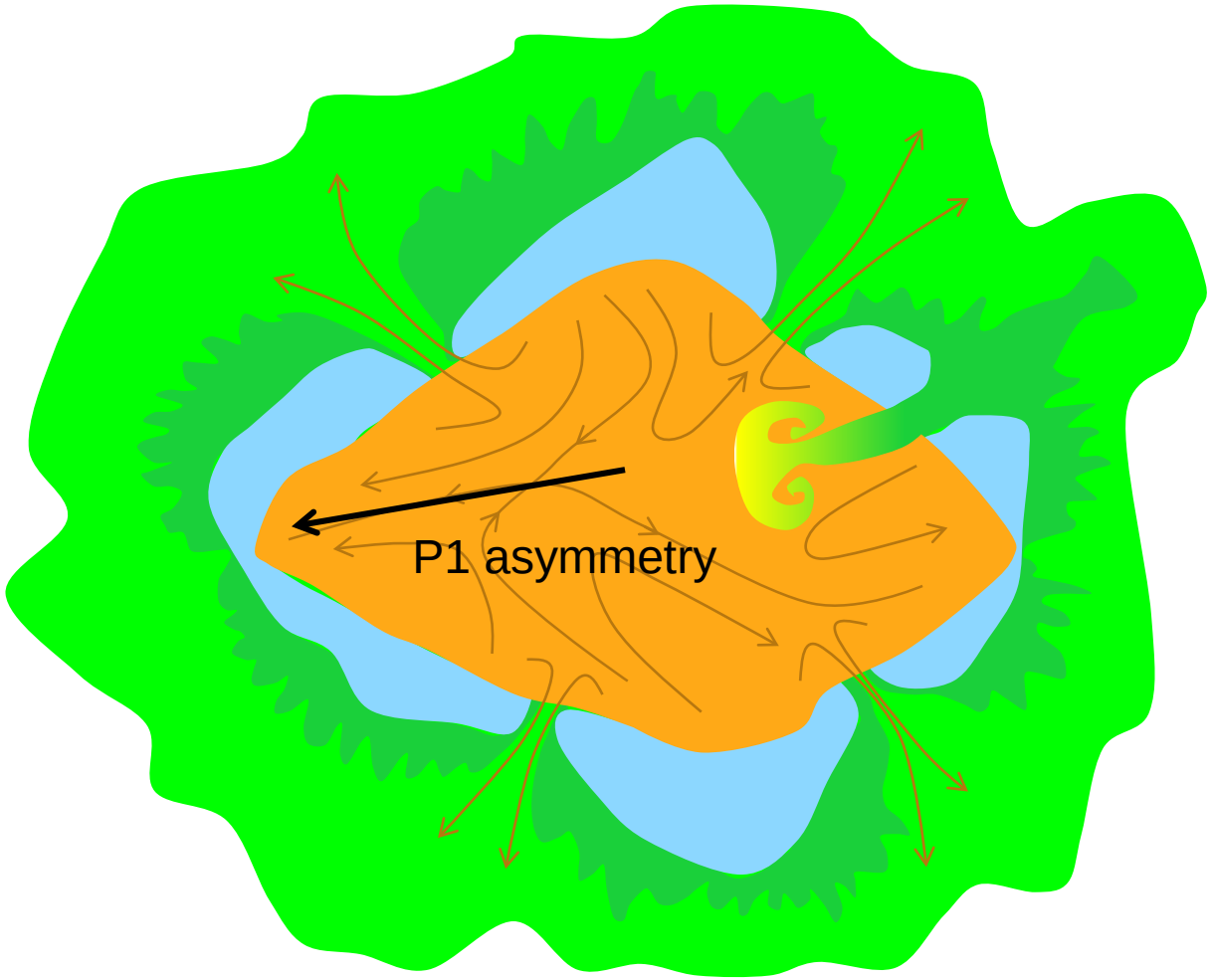
Symptoms of imperfect stagnation
P2, P4
3D

We have a list of hypothetical imperfections that we aim to correct



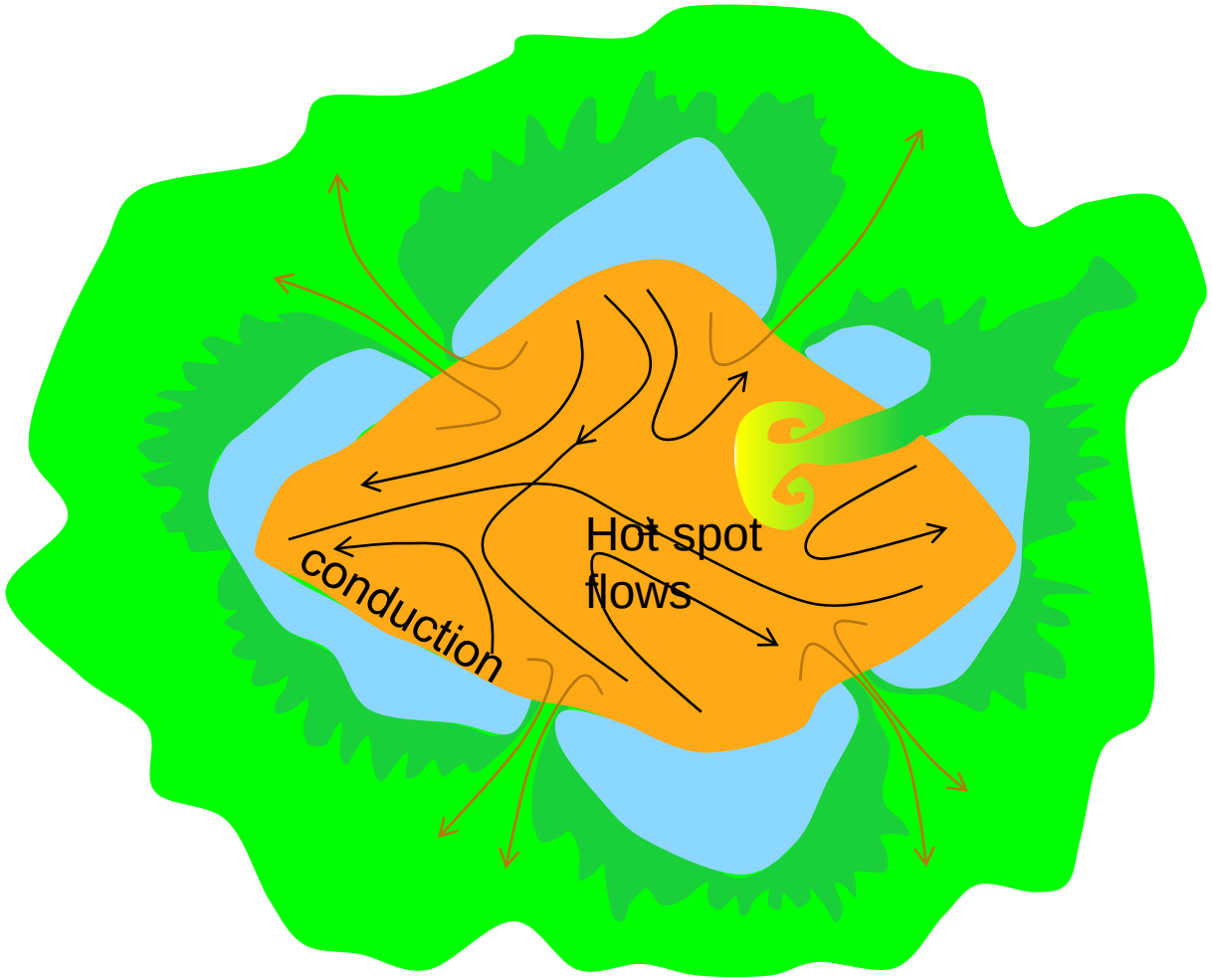
Symptoms of imperfect stagnation
P2, P4
3D
Tent scars

We have a list of hypothetical imperfections that we aim to correct



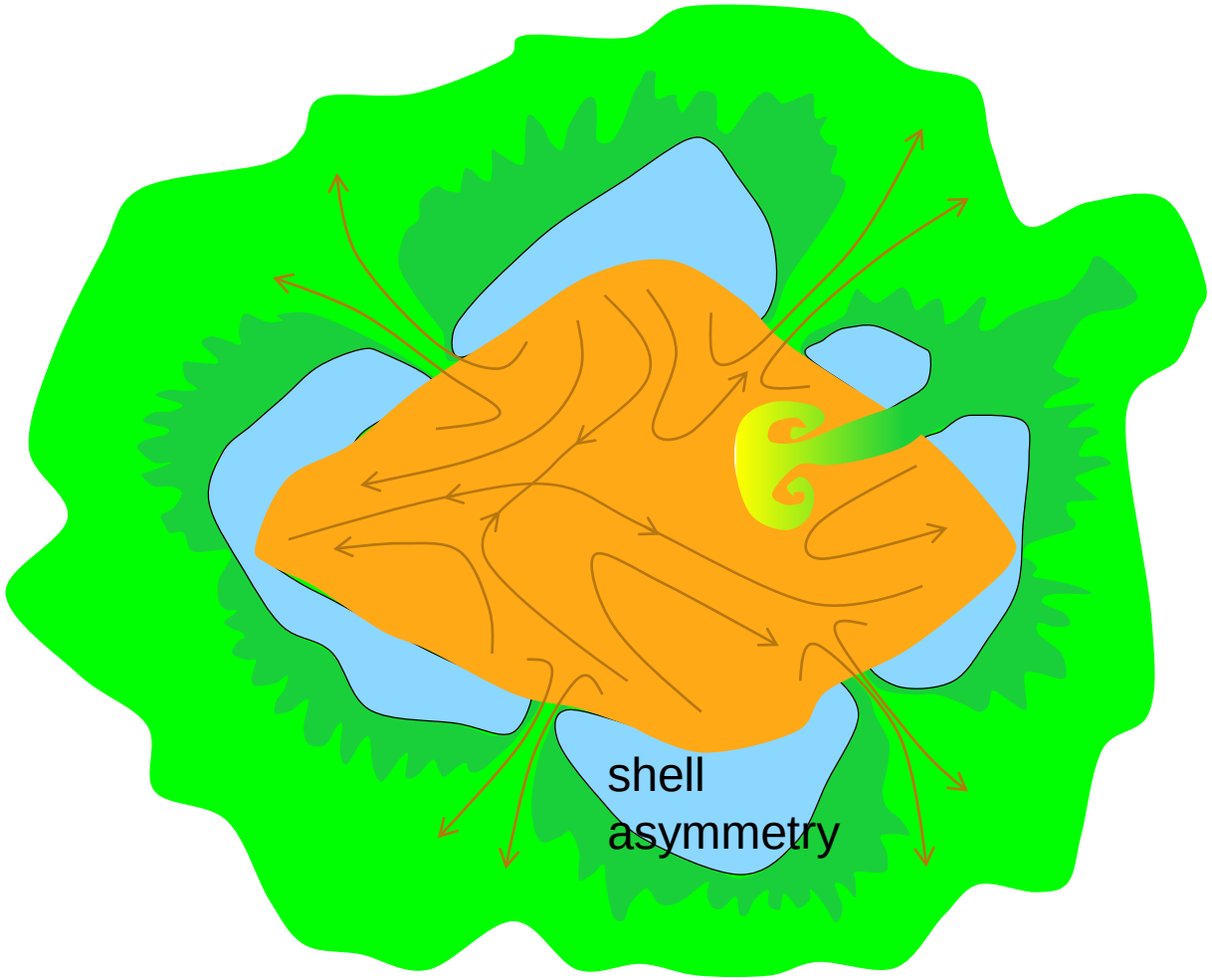
Symptoms of imperfect stagnation
P2, P4
3D
Tent scars
P1

We have a list of hypothetical imperfections that we aim to correct



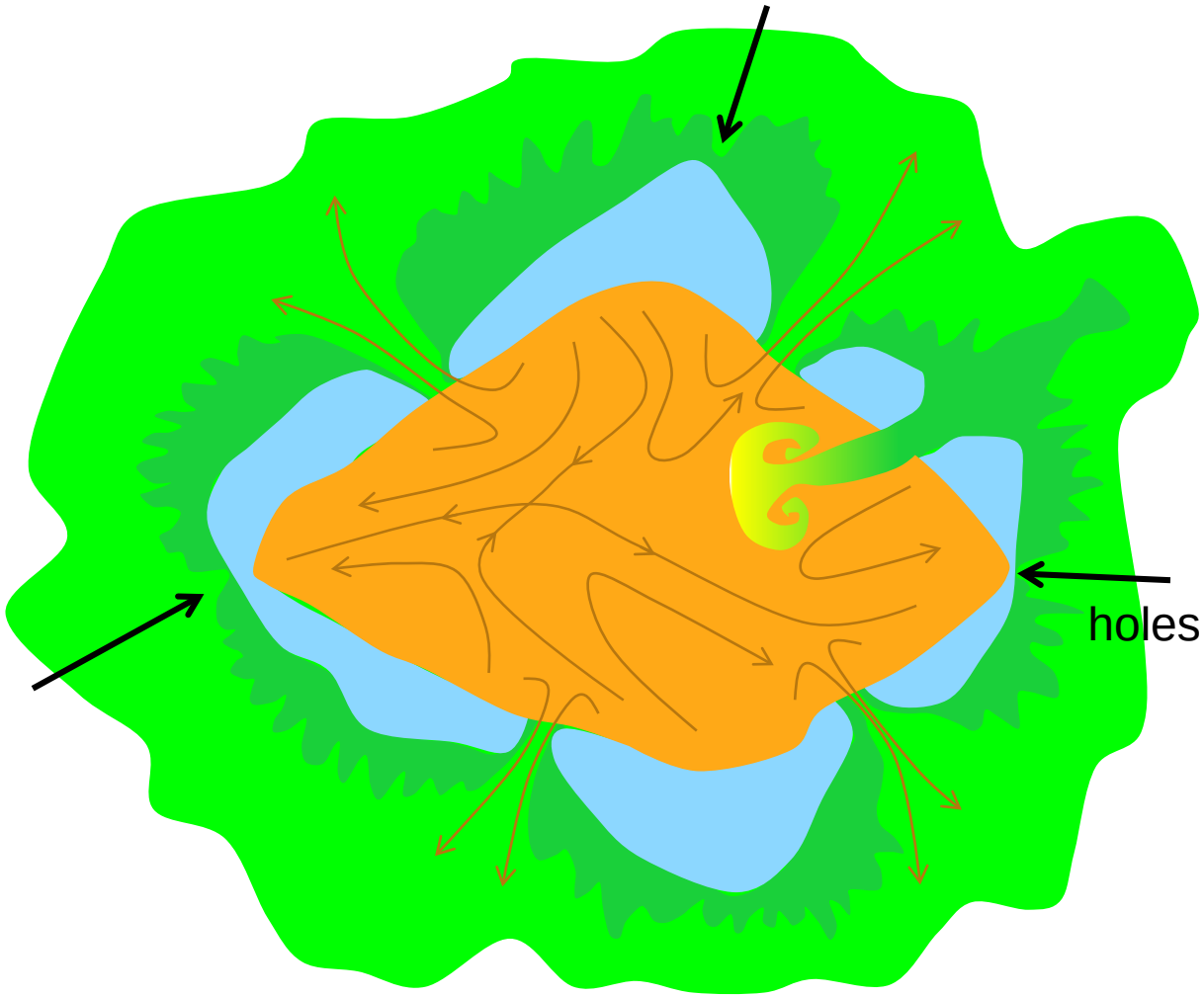
Symptoms of imperfect stagnation
P2, P4
3D
Tent scars
P1
High Ti

We have a list of hypothetical imperfections that we aim to correct



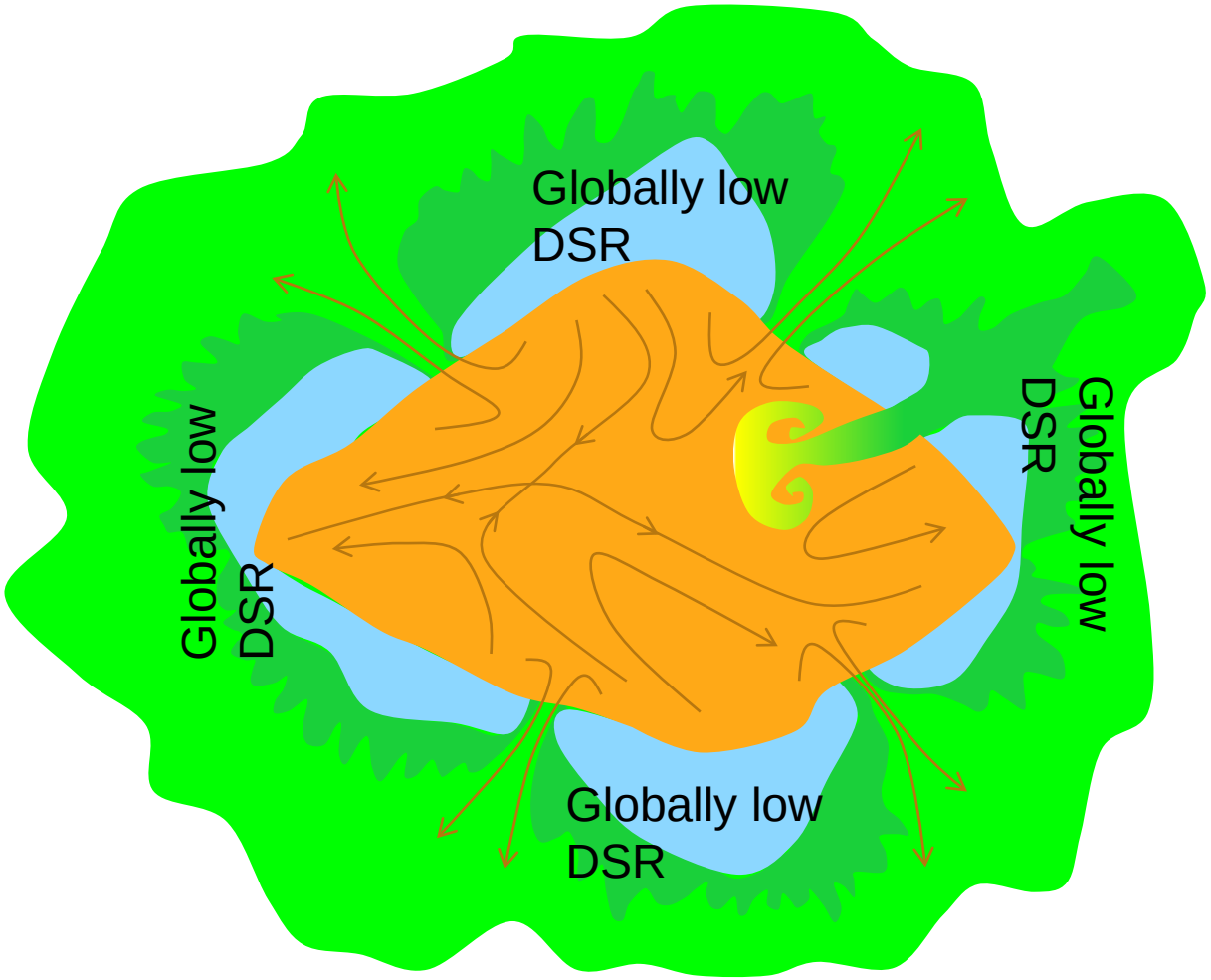
Symptoms of imperfect stagnation
P2, P4
3D
Tent scars
P1
High Ti and RKE
Cold shell asymmetry

We have a list of hypothetical imperfections that we aim to correct



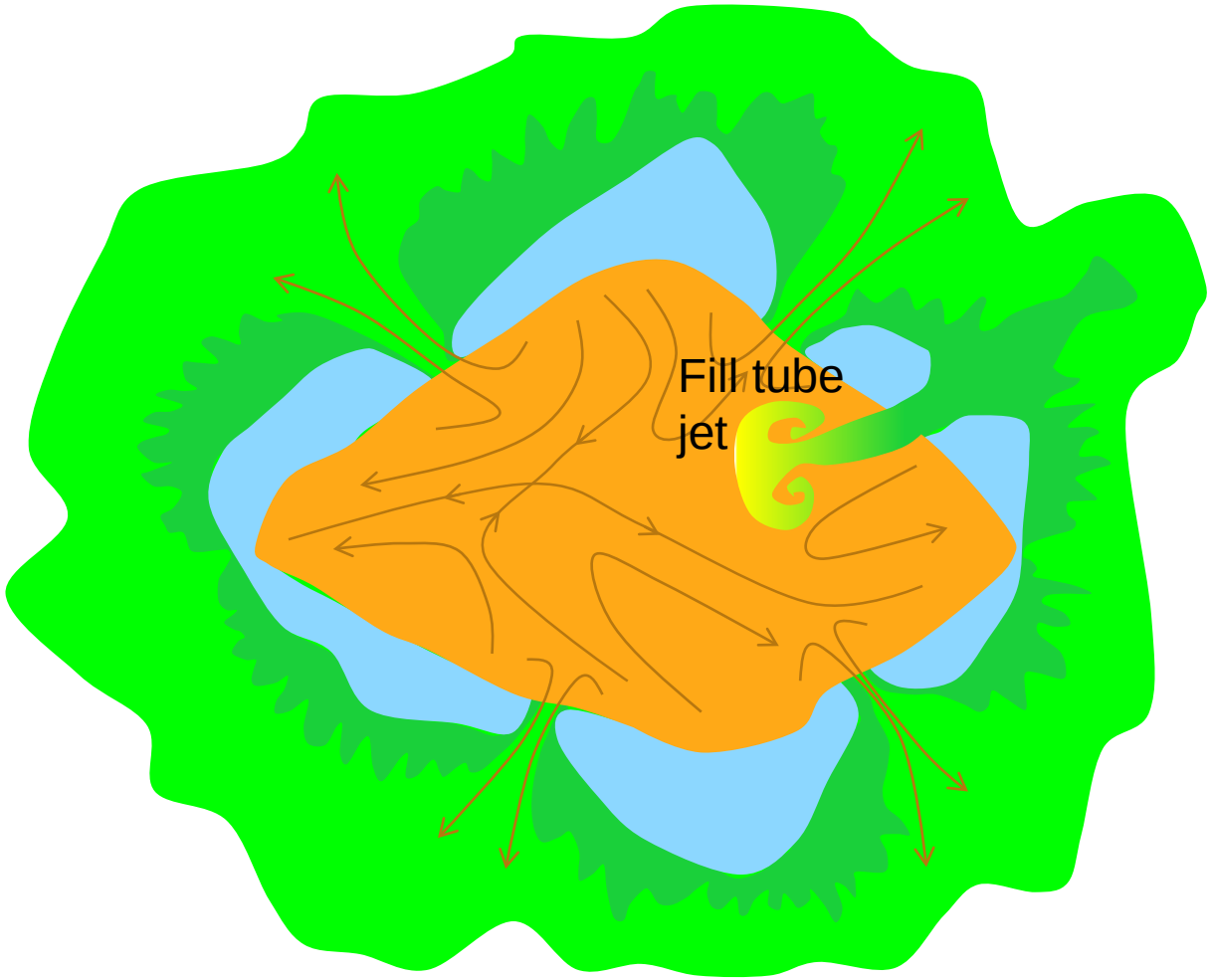
Symptoms of imperfect stagnation
P2, P4
3D
Tent scars
P1
High Ti
Cold shell asymmetry
Holes/burnthrough

We have a list of hypothetical imperfections that we aim to correct



Symptoms of imperfect stagnation
P2, P4
3D
Tent scars
P1
High Ti
Cold shell asymmetry
Holes/burnthrough
Low DSR

We have a list of hypothetical imperfections that we aim to correct



Symptoms of imperfect stagnation
P2, P4
3D
Tent scars
P1
High Ti
Cold shell asymmetry
Holes/burnthrough
Low DSR
Fill tube

Imperfections are being addressed by new analysis, measurements, and experiments

Symptom	Current diagnostic	Improved diagnostic or analysis	disease	cure
P2, P4	2DConA, GXD, NI	DIXI, CNXI	Hohlraum asymmetry	Hohlraum improvements,CF, CCR, pulse length, splitting
3D	Polar GXD, fNADS, nTOF	new fNADS, prec. nTOF, N. pole nTOF	Hohlraum asymmetry, engineering features	CR, pulse length
Tent scars	HGR	- - -	Pressure loss from tent perturbation	Modified capsule suspension, α, CR
P1	nTOF, fNADS	Prec. nTOF, new fNADS, N. pole nTOF	Superposition of hohlraum asymmetry and mode-1 symmetry breaking	CF, CCR, pulse length, splitting, altered ROE
High Ti	nTOF, MRS	Prec nTOF, Te msmt, improved peak analysis, Te analysis	Hohlraum asymmetry, engineering features	CF, CCR, pulse length
Cold shell asymmetry	fNADS	New fNADS, Compton radiography	Hohlraum asymmetry, engineering features	CF, CCR, pulse length
Holes	fNADS, GXD	New fNADS	Burnthrough, RT	Shell thickness, α, CR, dopant
Low DSR	nTOF, MRS	Prec. nTOF	Preheat, shock timing	Shock timing, velocity, preheat control
Fill tube	GXD, Ross Pair	Spectroscopy	Mass injection by fill tube	Modified FT, a, velocity

While we have several guiding hypotheses, we also have holes in our understanding

While we have several guiding hypotheses, we also have holes in our understanding

- We aren't certain of the ranking of our imperfection
- Some processes are potentially unknown to us
- Some processes make hypothesis generation difficult
  - Species separation: hard to model and test
  - Kinetic effects: hard to model and test
  - Physical data (conduction, viscosity): hard to test

1. Current understanding of experiments
2. Hypotheses for discrepancies between experiments and design/modeling
3. Measurements to test the hypotheses for the discrepancies

Our strategy is to test first the hypotheses that we can most directly measure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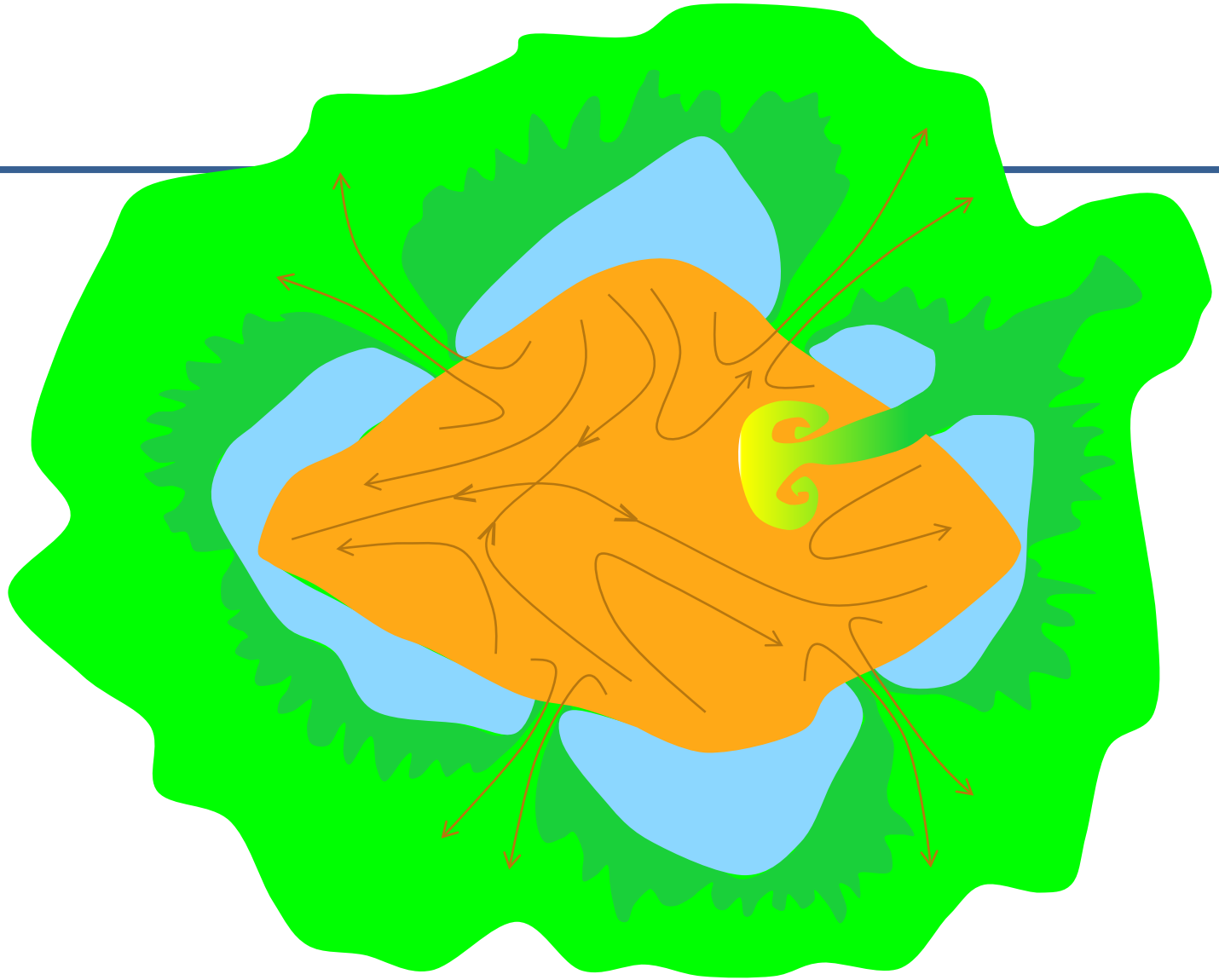
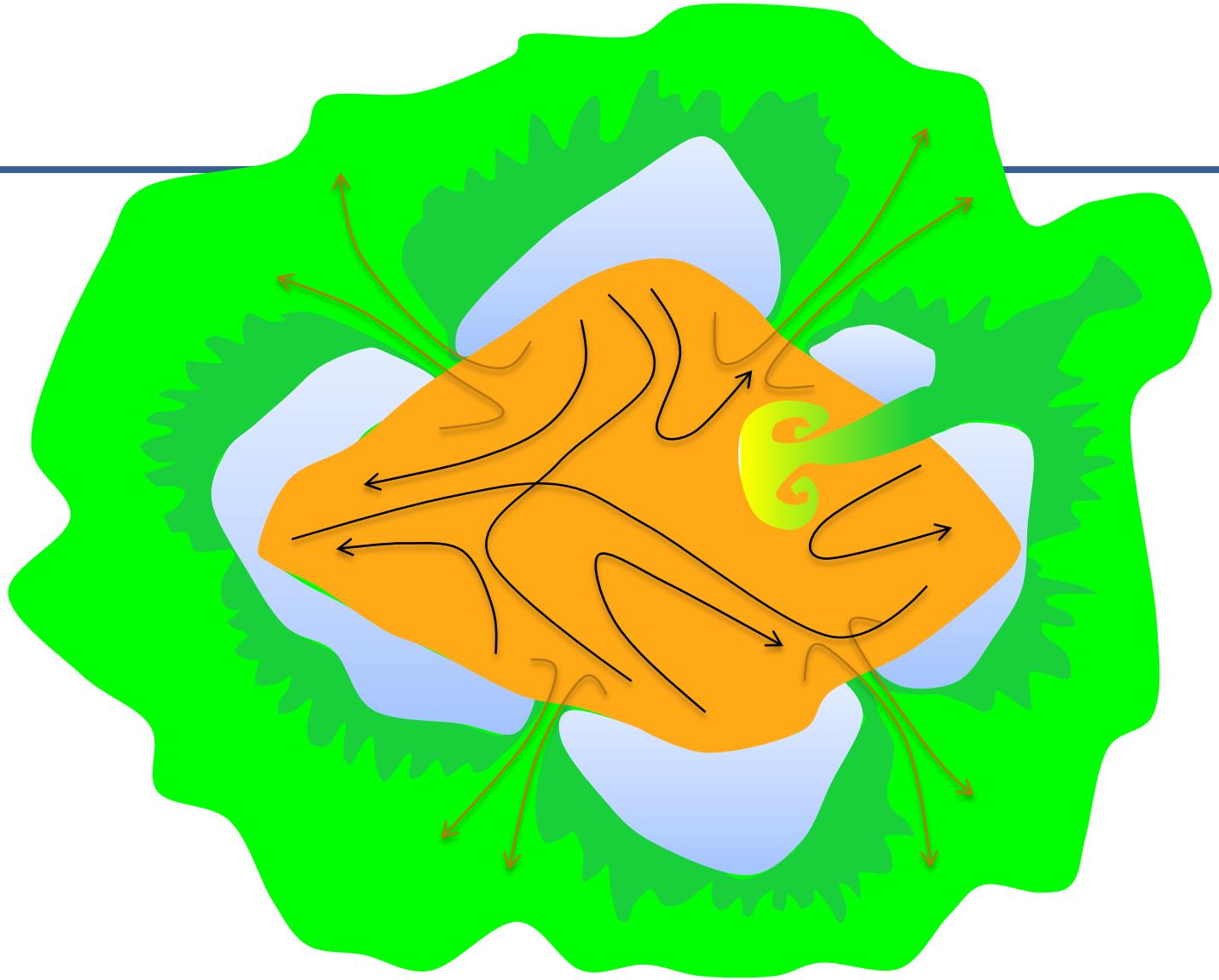
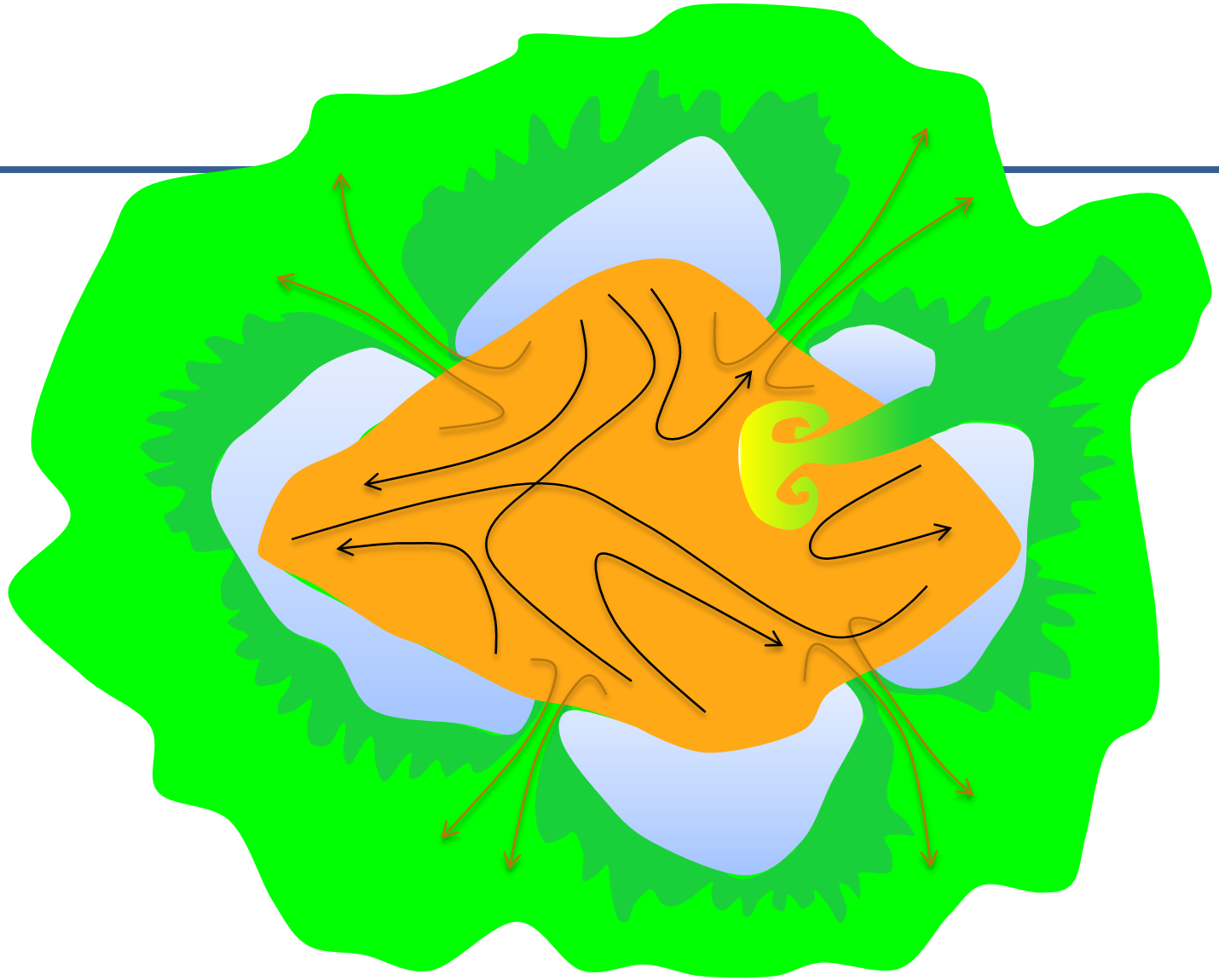
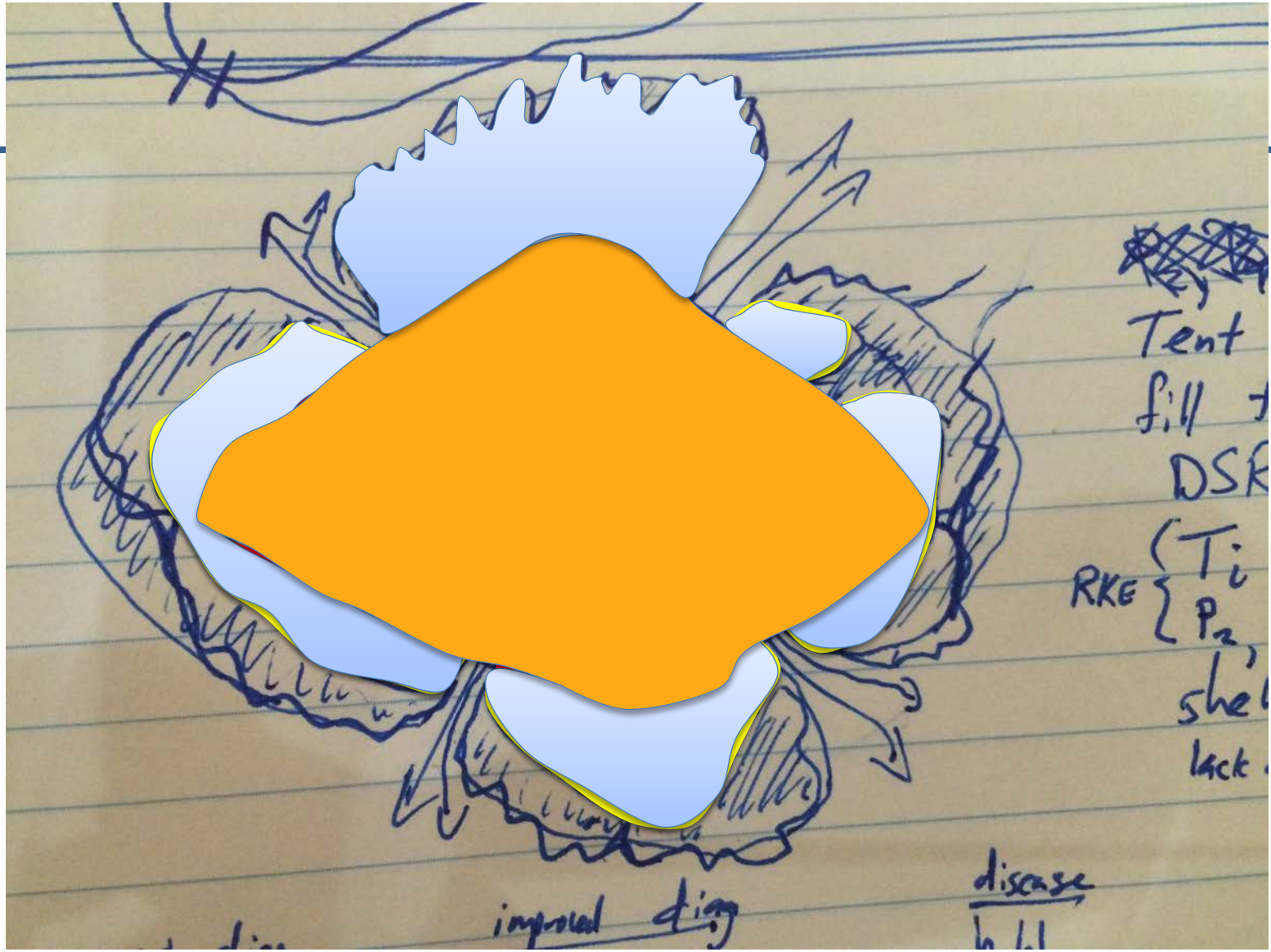
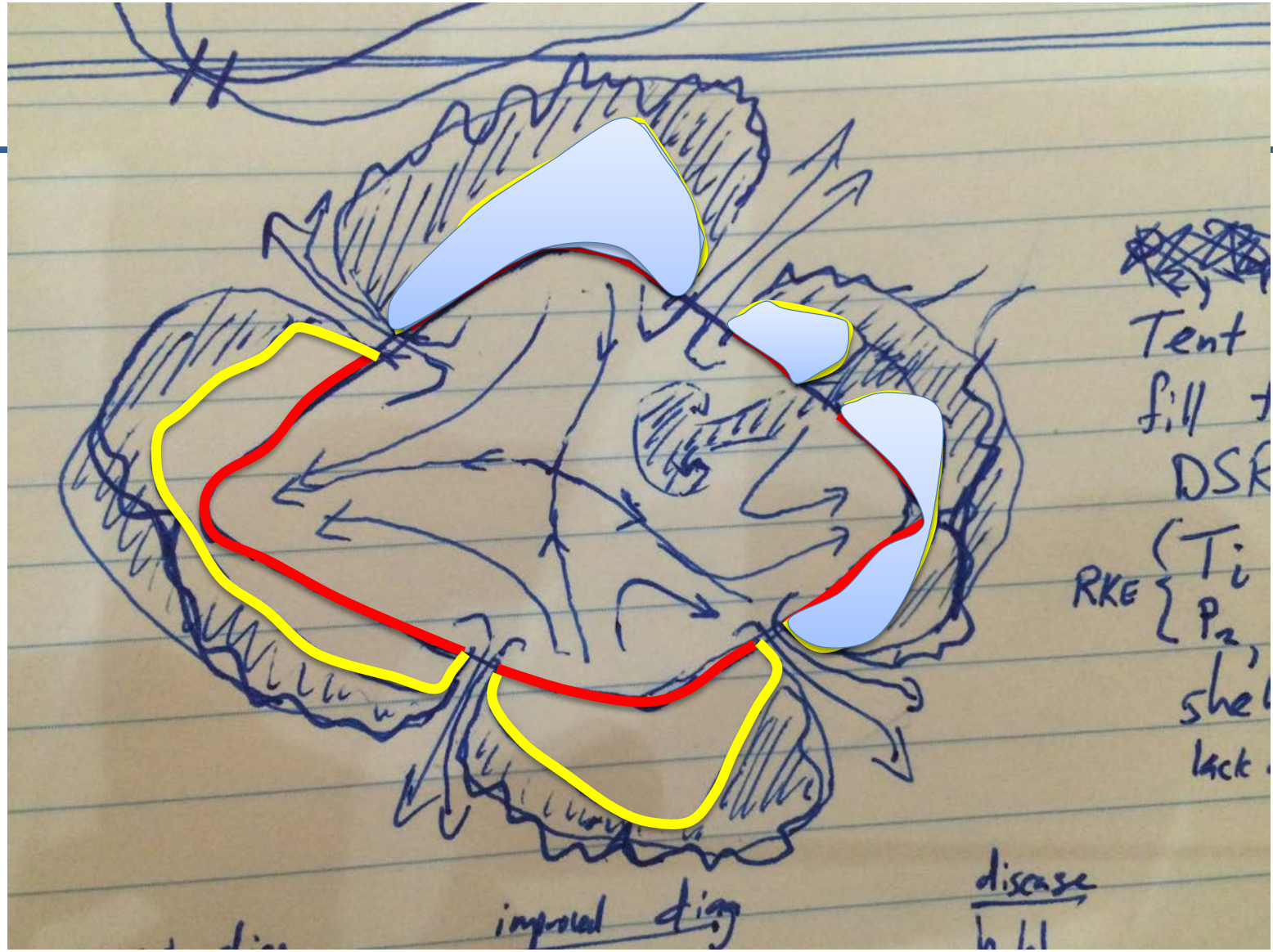







Tent
fill
DSR
RKE
Ti
P2
she
lack
disease
impaired diag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fill
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