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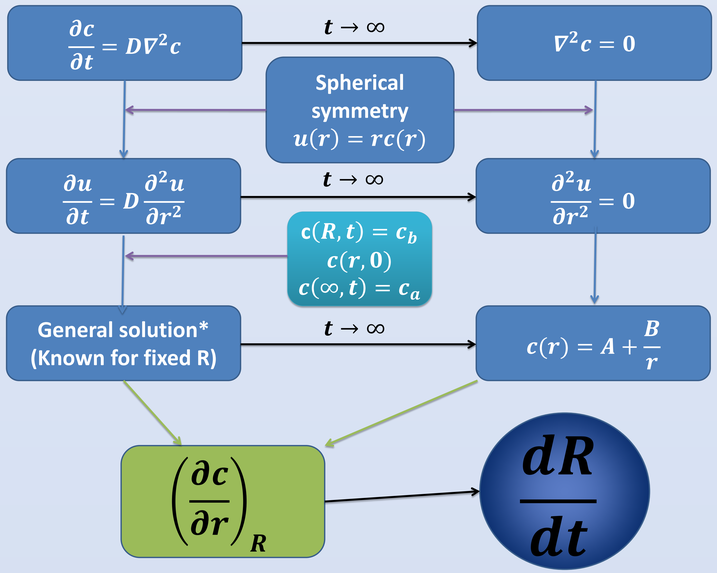


***General Solution (fixed R, specific IC and BC):**

$$rc(r,t) = \frac{1}{2\sqrt{\pi Dt}}\int_0^\infty u(x',0)\left\{exp\left(-\frac{(x'-x)^2}{4Dt}\right) - exp\left(-\frac{(x'+x)^2}{4Dt}\right)\right\}dx',$$

where $u(x,0) = (x+R)c(x+R,0)$, $x = r - R$, and $x' = r' - R$.

$$\frac{dR}{dt} = \frac{1}{3P_eR + 4\gamma}\left[3DRBT\left(\frac{\partial c}{\partial r}\right)_R - R^2\frac{dP_e}{dt}\right]$$

dR/dt is integrable only for a few forms of $(dc/dr)_R$ → Numerical integration

$(\partial c/\partial r)_R$ for different IC and base differential equations			
Base differential equation	**Initial condition**	**$(\partial c/\partial r)_R$**	**Remarks**
Full diffusion	$c(r,0) = \begin{cases} c_b, & r = R \\ c_a, & r > R \end{cases}$, (EPIC)	$(c_a - c_b)\left(\frac{1}{R} - \frac{1}{\sqrt{\pi Dt}}\right)$	2-Region Model, Discontinuous IC, no analytic results.
Full diffusion	$c(r,0) = c_a + \frac{R(c_b - c_a)}{r}$, (HIC)	$\frac{1}{R}(c_a - c_b)$	2-Region Model, analytic results for t_{diss} at fixed P_e.
Laplace	$c(r,0) = c_b + \frac{c_a - c_b}{\lambda - 1}\left(\lambda - \frac{\lambda R}{r}\right)$, (3RLV)	$\frac{\lambda(c_a - c_b)}{(\lambda - 1)R}$	3-Region Model, $t_{diss} \to 0$ as $\lambda \to 1$, for any R_0, unclear how to determine λ, analytic results for t_{diss} at fixed P_e.

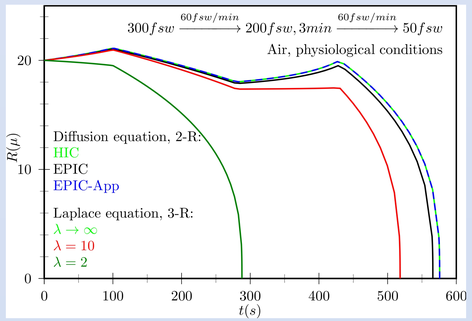
HIC (fixed P_e)

$$t_{diss} = \frac{P_eR_0^3 + 2\gamma R_0^2}{6D\gamma d}$$

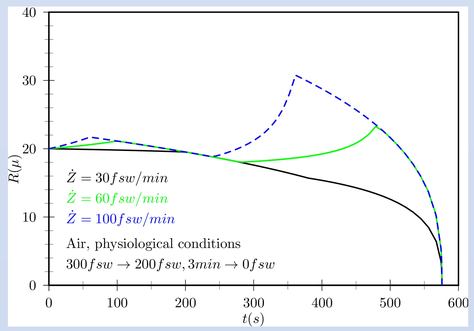
3RLV: (fixed P_e)

$$t_{diss} = \left(\frac{\lambda - 1}{\lambda}\right)\frac{P_eR_0^3 + 2\gamma R_0^2}{6D\gamma d}$$

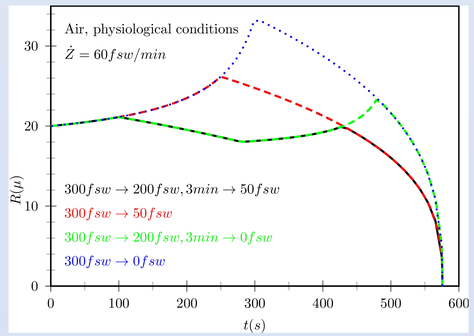
Different IC

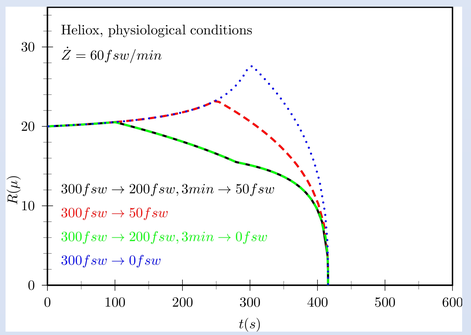


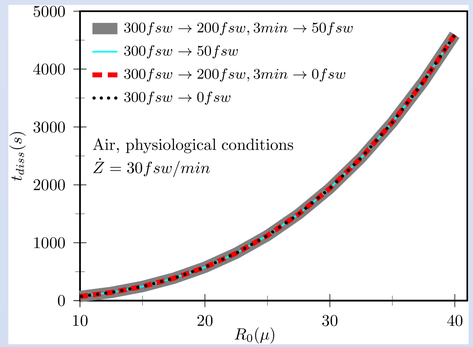
Different $\dot{Z}$, HIC

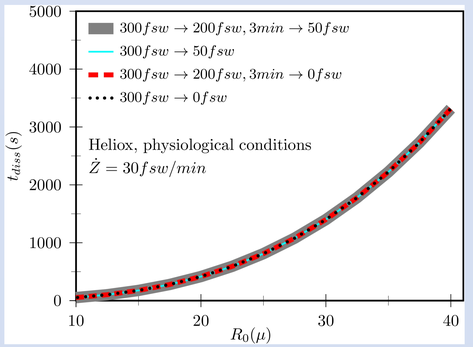


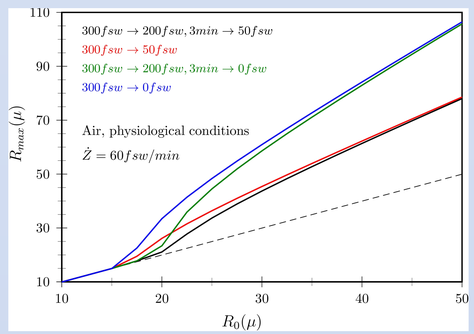
Different Ascent Profiles, HIC

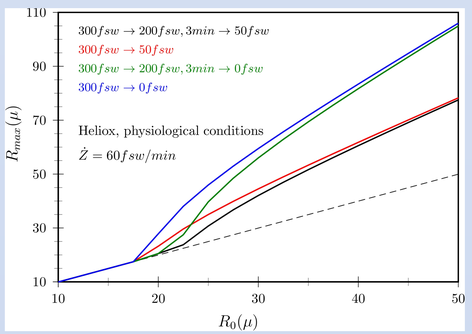












Conclusions: 1) A major underlying uncertainty stems from lack of knowledge of the thickness of the diffusion layer. 2) While the maximum radii of AGE are sensitive to the details of the ascent profile , the time-to-dissolution is not.

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