Chose  
Age of the solar system (from thill bob)  
Rediractive dating: (must love: -> abundent radiractive species)  

$$A \rightarrow B$$
; lifetime T; after time t,  
 $MA = MA0 e^{-t/T}$   
 $MB = MB0 e^{-t/T}$   
 $MB$ 

$$m_{p} = m_{p}(0) e^{-t/t}$$

$$m_{d} = g m_{p}(0) [1 - e^{-t/t}]$$
Drughter to porcent
$$m_{d} = g(e^{t/t} - 1)$$

$$m_{p}$$
More Gaughliceted: (skip all this st thing and go directly to Uranium and Pb-Pb detrig).
$$g^{2}b \rightarrow g^{2} \text{ St} \qquad helf-life 48.8 \text{ Gyr}$$
Not noble ges, so the rack will contain showhing Sr.  $m_{d}(0)$  to
$$m_{p} = m_{p}(0) e^{-t/t}$$

$$m_{d} = m_{d}(0) + gm_{q}(0) [1 - e^{-t/t}]$$
The this cert, assumptions are necessary. First, eliminate mpo  

$$m_{p} = m_{p}(0) e^{-t/t} = M_{d}(0) + gm_{p}(0) [1 - e^{-t/t}]$$

$$m_{d} = m_{d}(0) + gm_{p}(0) [1 - e^{-t/t}]$$

 $\Rightarrow x = b + y \left( \frac{t}{t} - 1 \right)$  $\frac{Nd}{hds} = \frac{Ndp}{hds} + \frac{g}{hds} \frac{hp}{hds} \left( \frac{e^{4/7}}{-1} \right)$ epoftype y=axts; with  $a = f(e^{\pm l\tau} - 1) \quad (slope)$  $a = np; \quad y = nd; \quad b = nd(0)$  $nds \quad nds \quad nds$ emphasize points from different somples would he in a hine Lead-lead dating (show recent reviews) 204 Pb is stelle 238 U -> 206 Pb (+112=4.47×10gr) 236U -> 207 Pb (tuz=7-04×108gr) (tin=1.4×10"yr) Too slow remore greater then I thyr 2327h -> 208 Pb The porent isotopes have high abundance; ferorable half-lines. Uranium systems.  $\frac{206 \text{ Pb}}{204 \text{ Pb}} = \left(\frac{206 \text{ Pb}}{104 \text{ Pb}}\right) + \frac{238 \text{ U}}{204 \text{ Pb}} \left(\frac{4 \pi_{1}}{204 \text{ Pb}}\right) (1)$ 

 $\frac{207}{204} P_{b} = \begin{pmatrix} 207 P_{b} \\ \hline 204 \\ P_{b} \end{pmatrix} + \frac{235}{204} P_{b} \begin{pmatrix} e^{t} h^{2} \\ e^{-1} \end{pmatrix} (11)$ 

 $y_1 = b_1 + a_1 \times 1$  $y_2 = b_2 + a_2 \times 2$ 

 $y_1 - b_1 = a_1 \times ($ 42-b2 = A2×2 \$  $\frac{y_2-b_2}{y_1-b_1} = \frac{a_2}{a_1} \cdot \frac{x_2}{x_1}$ 

71 = 206 P5 / 204 P5 72 = P6 / 204 P5  $x_1 = \frac{238}{235} \cup \frac{204}{204} Pb$  $x_2 = \frac{235}{200} \cup \frac{204}{204} Pb$ by = (206 Pb / 204 Pb) 0  $b_2 = \binom{207}{Pb} \frac{204}{Pb}$ 

 $a_1 = (e^{t/t_1} - 1); a_2 = (e^{t/t_2} - 1)$ 

 $\frac{\gamma_2 - b_2}{\gamma_1 - b_1} = \frac{a_2}{a_1} \cdot \frac{\chi_2}{\chi_1}$ 

 $\frac{\binom{202}{Pb}}{\binom{204}{Pb}} - \binom{202}{Pb} \frac{Pb}{Pb}_{0} - \binom{235}{238} \frac{4/7}{e^{t/7}} + \frac{1}{e^{t/7}}$ 

rype: $y - y_{0} = a$ yo= 2077/200 (207) y= 207 Pb 2 = 206 Pb 20 = 204 Plue (206) 201 Pb 204 PL 7-20  $\alpha = \frac{2350}{2380} \left( \frac{e^{\pm 1/1} - 1}{e^{\pm 1/1} - 1} \right)$ y=ax - ano+yo · y=ax+6 =>b=yo-axp 207 PL = 236 U (ett7n-1), 206 PL + 5 Kighlight that this is a 209 PL = 238 U (ett7n-1), 206 PL + 5 Kighlight that this is a 209 PL = 238 U (ett7n-1), 206 PL + 5 Kighlight that this is a line, the slope is the tame it to accorded torm with the exponentials.  $\frac{1}{x} \quad \frac{1}{x} = \alpha - \alpha \frac{x}{x} + \frac{1}{x} - \frac{1}{x} \frac{1}{x} + \frac{1}{x} - \frac{1}{x} + \frac{1}{x}$ yo= 2077/20 (207) y= 227Pb 2 = 206 Pb 20 = 204 Plan (206) 204 Pb 204 Pl  $\Delta = \frac{2350}{2380} \left( \frac{e^{\frac{1}{2}t}}{e^{\frac{1}{2}t}} \right)$ 

1/2 m 4 = a - a × 0 + 40 × × × × -7 (227 Pb). 2022 Pb = Q - Q 206 Pb (201 Pb + 2027 Pbo , (204 Pb) 201 Pb (206 Pb + 201 Pb (206 Pb) (206 Pb) (201 Pb (201 Pb))  $\frac{203Pb}{206PL} = \frac{204Pb}{200} \left[ \begin{array}{c} 2007bo}{200} - a \frac{106}{200} \\ \frac{100}{Pb} \end{array} \right] + a$ intercept slope Plot 24 Pb vs 227 Pb (inverse kad-lead dating) relies on the intrept. (review) CAIS: MacPherson 2014 First: smelin 2002 0) 21 Connelly etc 2012 Show age of CAIS, dispersion of chondrule ages, CAIS Loing older, and 2617g abundance pointing to the presence of 26 \$1. => Formation near supernove. Muminum 26 - short helf-life 1 0.72 Tyr Energy to melt smell sodies. (Als formed ver the sun. Cas formetion event short (len the 10<sup>4</sup> yrs)