





$$\sigma = \frac{T_{\text{sys}}}{\eta_{\text{spec}} \sqrt{dv} t},$$











$$\sigma = \sqrt{\sigma_{\text{on}}^2 + \sigma_{\text{off}}^2} = \frac{T_{\text{sys}}}{\eta_{\text{spec}} \sqrt{d\nu} t_{\text{sig}}} \quad \text{with} \quad t_{\text{sig}} = \frac{t_{\text{on}} t_{\text{off}}}{t_{\text{on}} + t_{\text{off}}},$$













$$T_{sys} = \frac{(1 + G_{im}) \exp \{ \tau_s A \}}{F_{eff}} [F_{eff} T_{atm} (1 - \exp \{ -\tau_s A \}) + (1 - F_{eff}) T_{cab} + T_{rec}],$$





4 = 1/2 + 1/2 + 1/2 + 1/2



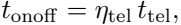












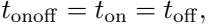




pop1



$$\sigma = \frac{T_{\text{sys}}}{\eta_{\text{spec}} \sqrt{dv} \, n_{\text{pol}} \, t_{\text{sig}}} \quad \text{with} \quad t_{\text{sig}} = \frac{t_{\text{on}} \, t_{\text{off}}}{t_{\text{on}} + t_{\text{off}}}.$$



$$t_{sig} = \frac{t_{on}}{2} = \frac{t_{off}}{2} = \frac{t_{onoff}}{2},$$

$$\sigma_{\text{fsw}} = \frac{\sqrt{2} T_{\text{sys}}}{\eta_{\text{spec}} \sqrt{dv} \, \eta_{\text{pol}} \, \eta_{\text{tel}} \, t_{\text{tel}}}.$$

$$t_{on} = t_{off} = \frac{t_{onoff}}{2},$$

$$t_{sig} = \frac{t_{on}}{2} = \frac{t_{off}}{2} = \frac{t_{onoff}}{4},$$

$$\sigma_{\text{psw}} = \frac{2 T_{\text{sys}}}{\eta_{\text{spec}} \sqrt{d\nu} \, \eta_{\text{pol}} \, \eta_{\text{tel}} \, t_{\text{tel}}} .$$



1990



$$A_{\text{beam}} = \frac{n_{\text{grid}} \pi \theta^2}{4 \ln(2)}$$





$$n_{grid} = 1 + \frac{1}{9} \approx 1.11.$$



$$n_{\text{beam}} = \frac{A_{\text{map}}}{A_{\text{beam}}}.$$

beard

od

beard

beard
girl

$$t_{\text{sig}}^{\text{beam}} = \frac{t_{\text{on}}^{\text{beam}} t_{\text{off}}^{\text{beam}}}{t_{\text{on}}^{\text{beam}} + t_{\text{off}}^{\text{beam}}}$$



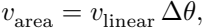




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ECONOMICS
AND BUSINESS

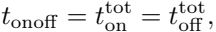








$$\Delta \theta = \frac{\theta}{2.5}$$



$$t_{\text{beam on}} = t_{\text{beam off}} = \frac{t_{\text{onoff}}}{n_{\text{beam}}} ;$$

$$t_{\text{sig}}^{\text{beam}} = \frac{t_{\text{on}}^{\text{beam}}}{2} = \frac{t_{\text{off}}^{\text{beam}}}{2} = \frac{t_{\text{onoff}}}{2n_{\text{beam}}},$$

$$\sigma_{\text{fsw}} = \frac{\sqrt{2} \, n_{\text{beam}} \, T_{\text{sys}}}{\eta_{\text{spec}} \sqrt{d\nu} \, n_{\text{pol}} \, \eta_{\text{tel}} \, t_{\text{tel}}} .$$

$$\frac{A_{\text{map}}}{t_{\text{onoff}}} \leq v_{\text{area}}^{\text{max}}.$$

optimal $\geq$ von Neumann $\geq$ cod

WORLDWIDE

$$t_{\text{sig}} = \frac{t_{\text{on}}}{1 + \frac{1}{\sqrt{n_{\text{on/off}}}}} \quad \text{and} \quad \sigma = \frac{T_{\text{sys}}}{\eta_{\text{spec}} \sqrt{d\nu} n_{\text{pol}} t_{\text{on}}} \sqrt{1 + \frac{1}{\sqrt{n_{\text{on/off}}}}}.$$

Alvin Brown

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spiral

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opportunity

$$n_{\text{submap}} = \frac{A_{\text{map}}}{A_{\text{submap}}} \cdot$$

$$n_{\text{on/off}} = \frac{A_{\text{submap}}}{A_{\text{beam}}}.$$

Handwritten text in a cursive script, likely a signature or name, rendered in a pixelated, grayscale style. The text is split into three segments by two horizontal lines. The first segment reads "Handwritten", the second segment reads "Text", and the third segment reads "in a cursive script".

Alvin Brown
—
Alfred Brown.

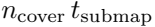
Evbbaap = vovv vovv

$$t_{\text{on}}^{\text{beam}} = n_{\text{cover}} t_{\text{on}}^{\text{cover}} \text{ and } t_{\text{off}}^{\text{beam}} = n_{\text{cover}} t_{\text{off}}^{\text{cover}} \text{ with } t_{\text{off}}^{\text{cover}} = \sqrt{n_{\text{on}}/n_{\text{off}}} t_{\text{on}}^{\text{cover}}.$$

$$t_{\text{sig}}^{\text{beam}} = n_{\text{cover}} t_{\text{sig}}^{\text{cover}} = \frac{n_{\text{cover}} t_{\text{submap}}}{n_{\text{on/off}} + \sqrt{n_{\text{on/off}}}}.$$

$$t_{\text{onoff}} = n_{\text{cover}} \cdot \text{submap}(n_{\text{on}} / \text{off} \cdot t_{\text{on}} + t_{\text{off}}) \cdot \text{cover} + t_{\text{off}} \cdot \text{cover}.$$

$$t_{\text{onoff}} = n_{\text{cover}} t_{\text{submap}} n_{\text{submap}} \left(1 + \frac{1}{\sqrt{n_{\text{on/off}}}} \right).$$



$$t_{\text{onoff}} = t_{\text{beam}} \sqrt{\nu_{\text{submap}} \left(1 + \sqrt{\nu_{\text{onoff}}} \right)^2}.$$

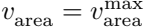
$$t_{\text{onoff}} = t_{\text{sig}} \left(\sqrt{n_{\text{vibmap}}} + \sqrt{n_{\text{beam}}} \right)^2.$$

$$\sigma_{\text{psw}} = \frac{(\sqrt{n_{\text{beam}}} + \sqrt{n_{\text{submap}}}) T_{\text{sys}}}{\eta_{\text{spec}} \sqrt{dv} \eta_{\text{pol}} \eta_{\text{tel}} t_{\text{tel}}} .$$

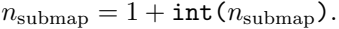
Adaptation

$$n_{\text{submap}} = \frac{A_{\text{map}}}{v_{\text{area}} t_{\text{submap}}}.$$





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evbvdap v ap v abe v ax
ax



$$t_{\text{sig}}^{\text{beam}} = \frac{T_{\text{sys}}^2}{\eta_{\text{spec}}^2 \sigma^2 dv n_{\text{pol}}},$$



$$t_{\text{onoff}} = t_{\text{sig}} \left(\sqrt{n_{\text{vibmap}}} + \sqrt{n_{\text{beam}}} \right)^2,$$



1991-1992

$$n_{\text{on/off}} = \frac{n_{\text{beam}}}{n_{\text{submap}}},$$

$$n_{\text{cover}} = \frac{t_{\text{sig}}^{\text{beam}}}{t_{\text{submap}}} \left(n_{\text{on/off}} + \sqrt{n_{\text{on/off}}} \right) ,$$

$$t_{\text{on}}^{\text{beam}} = \frac{n_{\text{cover}} t_{\text{submap}}}{n_{\text{on/off}}}$$

beam
off



beam
on

beam
on/off





Answer to the question



$$\sigma_{\text{fsw}} = \frac{\sqrt{2} \, n_{\text{beam}} \, T_{\text{sys}}}{\eta_{\text{spec}} \sqrt{d\nu} \, n_{\text{pol}} \, \eta_{\text{tel}} \, t_{\text{tel}}},$$

$$\sigma_{\text{psw}} = \frac{(\sqrt{n_{\text{beam}}} + \sqrt{n_{\text{submap}}}) T_{\text{sys}}}{\eta_{\text{spec}} \sqrt{dv} \eta_{\text{pol}} \eta_{\text{tel}} t_{\text{tel}}} .$$

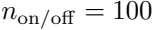
$$\frac{\sigma_{\text{psw}}}{\sigma_{\text{fsw}}} = \frac{1}{\sqrt{2}} \left(1 + \sqrt{\frac{n_{\text{submap}}}{n_{\text{beam}}}} \right) .$$

$$\frac{n_{\text{beam}}}{n_{\text{submap}}} = n_{\text{on/off}} \geq \frac{1}{3 - 2\sqrt{2}} \sim 6.$$

QWERTYUIOPASDFGHJKLZXCVBNM

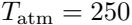
WORLDWIDE





$$n_{\text{on/off}} = \frac{t_{\text{stable}}}{A_{\text{beam}}/v_{\text{area}}^{\text{max}}},$$

A pixelated, grayscale image of the text "P.O. 15". The characters are rendered in a blocky, digital font style. The "P" and "O" are large and prominent, while the "15" is smaller and positioned to the right. The entire image has a low-resolution, dithered appearance.





1992

20

20





100%





2460'



VGHS



$$v_{linear}^{max} = f_{dump} \frac{\theta}{4} \text{ arcsec/s}$$

$$v_{\text{area}}^{\text{max}} = f_{\text{dump}} \frac{\theta}{2.5} \frac{\theta}{4} \text{arcsec}^2/\text{s} \quad \text{or} \quad v_{\text{area}}^{\text{max}} = f_{\text{dump}} \frac{\theta^2}{10} \text{arcsec}^2/\text{s}$$





$$t_{\text{onoff}} = t_{\text{on/off}} + t_{\text{off}} = (t_{\text{on/off}} + t_{\text{off}})$$

$$t_{\mathrm{onoff}} = \frac{T_{\mathrm{sys}}^2}{\eta_{\mathrm{spec}}^2 \sigma^2 \, dv} \left(1 + n_{\mathrm{on/off}} + \alpha + \frac{n_{\mathrm{on/off}}}{\alpha} \right).$$

$$\frac{dt_{on/off}}{d\alpha}$$

$\propto$

1

—

$$\frac{r_{on/off}}{\alpha^2}$$

$$\alpha = \sqrt{n_{\text{on/off}}} \text{ or } t_{\text{off}}^{\text{optimal}} = \sqrt{n_{\text{on/off}}} t_{\text{on}}.$$