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An Updated Detection Pipeline for Precursor Emission in Type II Supernova 2020tlf

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1. SUPPLEMENTARY FIGURES & DATA

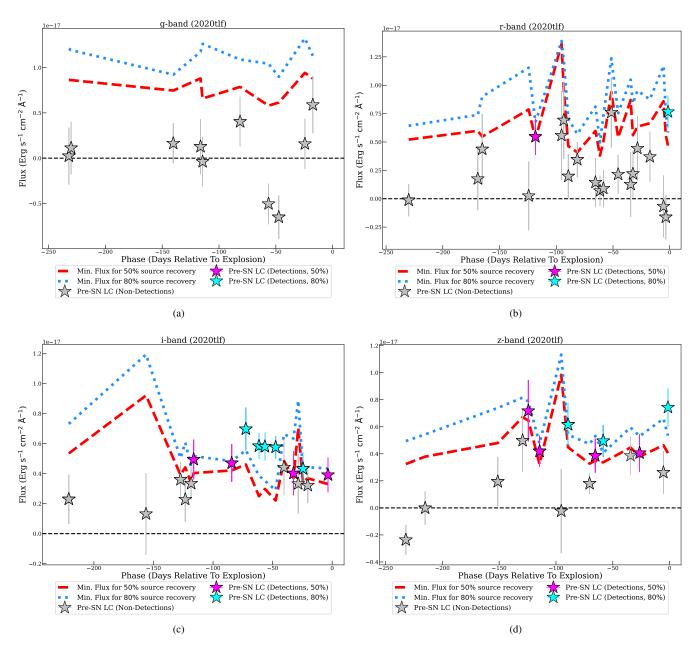


Figure 1. Pre-explosion *griz*-band light curve of SN 2020tlf. Detections above 80% and 50% recovery levels shown as cyan and magenta stars, respectively. Calculated flux at the SN location that is below these recovery levels is shown as grey stars. Minimum fluxes for 80% and 50% injected source recovery shown as blue dotted and red dashed lines, respectively.

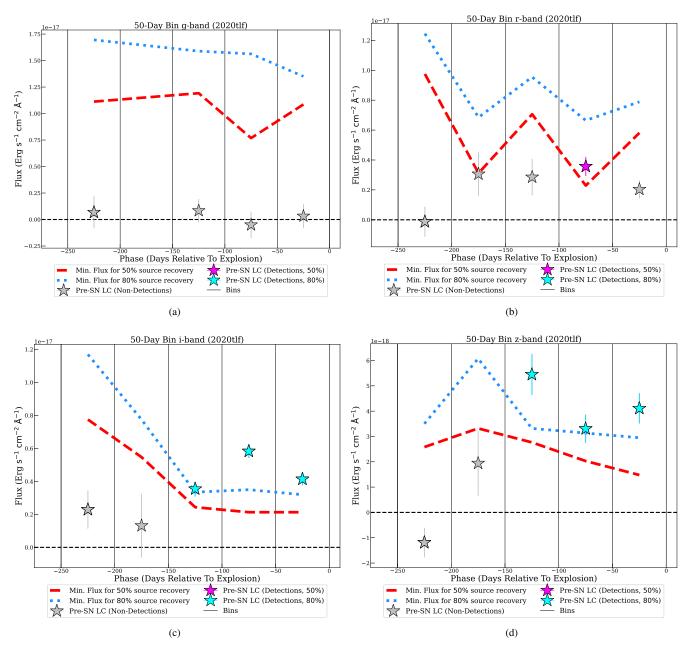


Figure 2. Pre-explosion *griz*-band light curve of SN 2020tlf where the flux has been stacked in 50 day bins. Detections above 80% and 50% recovery levels shown as cyan and magenta stars, respectively. Calculated flux at the SN location that is below these recovery levels is shown as grey stars. Minimum fluxes for 80% and 50% injected source recovery shown as blue dotted and red dashed lines, respectively.

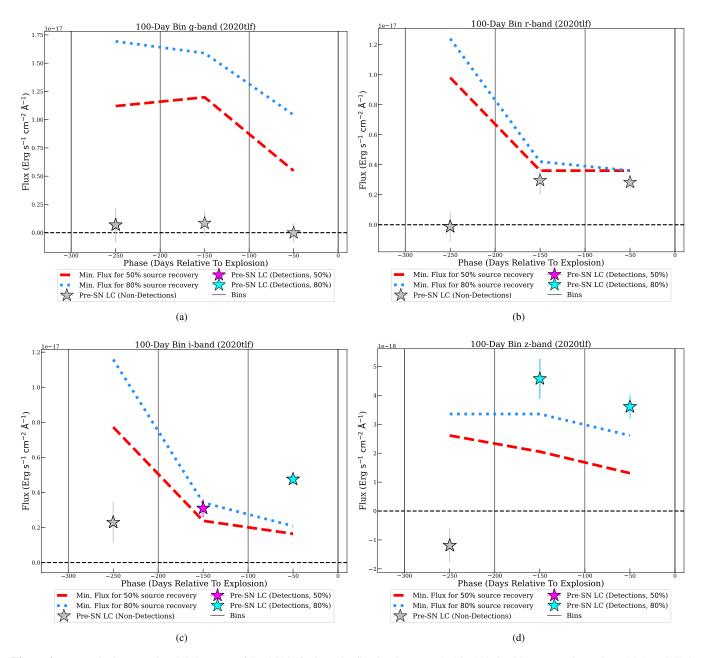


Figure 3. Pre-explosion *griz*-band light curve of SN 2020tlf where the flux has been stacked in 100 day bins. Detections above 80% and 50% recovery levels shown as cyan and magenta stars, respectively. Calculated flux at the SN location that is below these recovery levels is shown as grey stars. Minimum fluxes for 80% and 50% injected source recovery shown as blue dotted and red dashed lines, respectively.

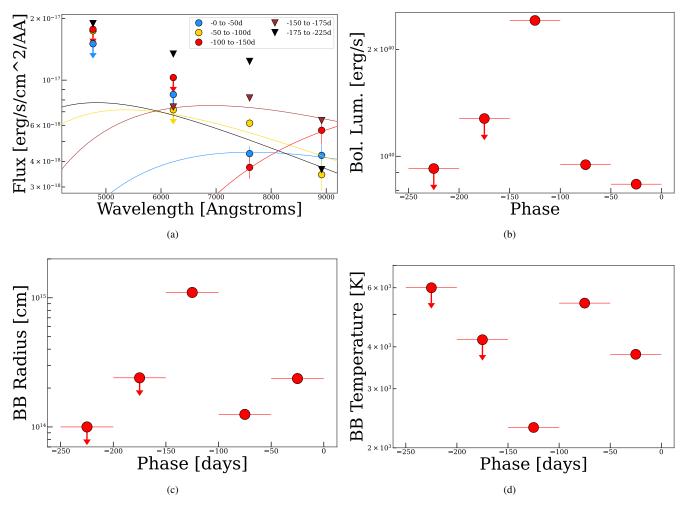


Figure 4. (a) Spectral energy distribution using *griz*-band limits and detections in 50 day pre-SN light curve bins. Best-fitting blackbody models shown as solid lines. Pre-explosion (a) bolometric luminosity, (b) blackbody radius, and (c) blackbody temperature as a function of phase. These parameters were derived from blackbody model fits to the 50 day binned SED.

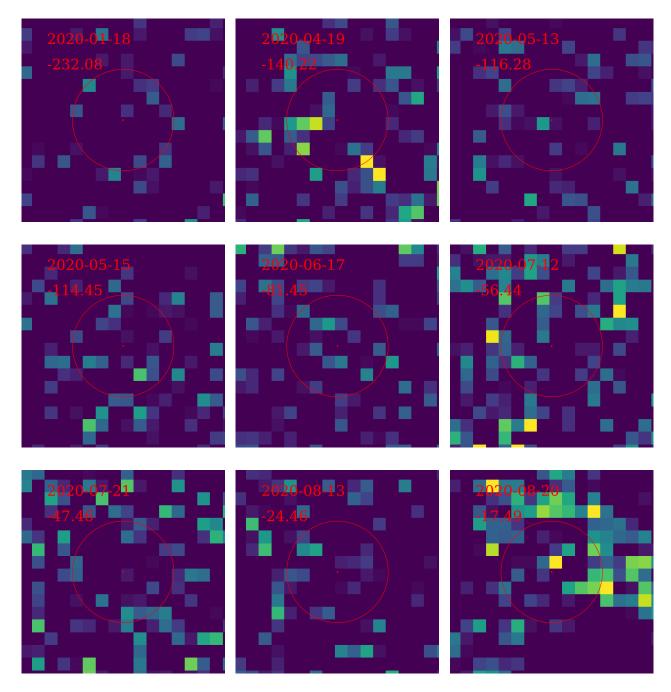


Figure 5. Pan-STARRS *g*-band pre-explosion images of SN 2020tlf. Images with pre-SN emission detected at above 80 and 50% recovery levels labeled with cyan and magenta, respectively.

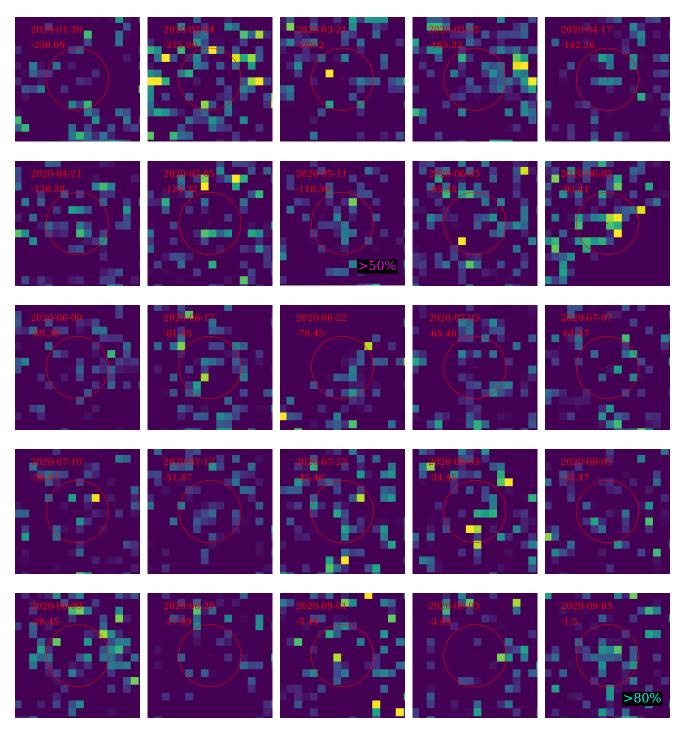


Figure 6. Pan-STARRS *r*-band pre-explosion images of SN 2020tlf. Images with pre-SN emission detected at above 80 and 50% recovery levels labeled with cyan and magenta, respectively.

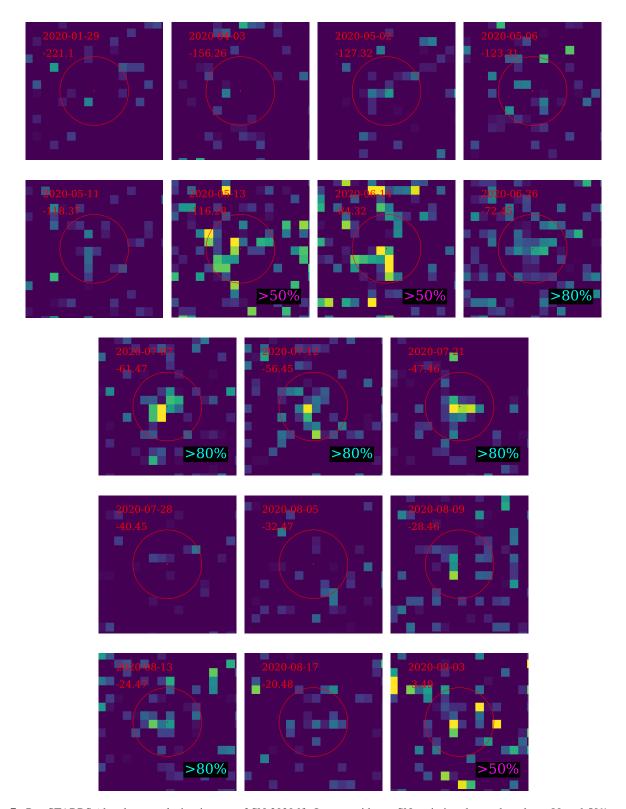


Figure 7. Pan-STARRS *i*-band pre-explosion images of SN 2020tlf. Images with pre-SN emission detected at above 80 and 50% recovery levels labeled with cyan and magenta, respectively.

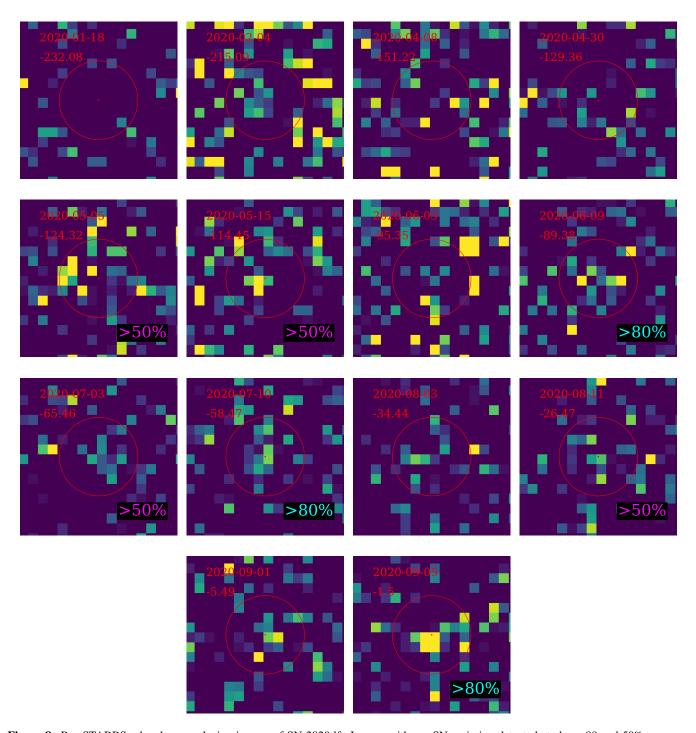


Figure 8. Pan-STARRS z-band pre-explosion images of SN 2020tlf. Images with pre-SN emission detected at above 80 and 50% recovery levels labeled with cyan and magenta, respectively.

 $\textbf{Table 1.} \ Pre\text{-SN PS1/YSE Photometry of SN } 2020tlf$

MJD	Phase ^a	Filter	Magnitude	Uncertainty	Recovery Efficiency
58866.7	-232.1	g	21.9	_	< 50%
58958.5	-140.2	g	22.0	_	< 50%
58982.5	-116.3	g	21.8	_	< 50%
58984.3	-114.4	g	22.2	_	< 50%
59017.3	-81.4	g	22.0	_	< 50%
59042.3	-56.4	g	22.3	_	< 50%
59051.3	-47.5	g	22.2	_	< 50%
59074.3	-24.5	g	21.8	_	< 50%
59081.2	-17.5	g	21.8	_	< 50%
58868.7	-230.1	r	21.8	_	< 50%
58929.5	-169.2	r	21.7	_	< 50%
58933.5	-165.2	r	21.8	_	< 50%
58974.4	-124.3	r	21.4	_	< 50%
58980.4	-118.4	r	21.8	0.3	> 50%
59003.4	-95.3	r	20.8	_	< 50%
59005.3	-93.4	r	21.2	_	< 50%
59009.4	-89.4	r	22.0	_	< 50%
59017.3	-81.4	r	22.1	_	< 50%
59033.3	-65.5	r	21.7	_	< 50%
59037.3	-61.5	r	22.2	_	< 50%
59040.3	-58.5	r	21.9	_	< 50%
59047.3	-51.5	r	21.2	_	< 50%
59053.3	-45.5	r	21.8	_	< 50%
59064.3	-34.4	r	21.3	_	< 50%
59066.3	-32.5	r	21.8	_	< 50%
59070.3	-28.4	r	21.6	_	< 50%
59081.2	-17.5	r	21.6	_	< 50%
59093.2	-5.5	r	21.3	_	< 50%
59095.2	-3.5	r	21.7	_	< 50%
59097.2	-1.5	r	21.4	0.2	> 80%

^aRelative to first light (MJD 59098.74)

 Table 2. Pre-SN PS1/YSE Photometry of SN 2020tlf (cont.)

MJD	Phase ^a	Filter	Magnitude	Uncertainty	Recovery Efficiency
				Uncertainty	
58877.6	-221.1	i	21.4	_	< 50%
58942.5	-156.3	i	20.8	_	< 50%
58971.4	-127.3	i	21.7	_	< 50%
58975.4	-123.3	i	21.6	_	< 50%
58980.4	-118.4	i	21.9	_	< 50%
58982.5	-116.3	i	21.4	0.3	> 50%
59014.4	-84.3	i	21.5	0.3	> 50%
59026.3	-72.4	i	21.1	0.2	> 80%
59037.3	-61.5	i	21.3	0.2	> 80%
59042.3	-56.4	i	21.3	0.2	> 80%
59051.3	-47.5	i	21.3	0.1	> 80%
59058.3	-40.4	i	21.5	_	< 50%
59066.3	-32.5	i	21.7	0.4	> 50%
59070.3	-28.5	i	21.1	_	< 50%
59074.3	-24.5	i	21.6	0.3	> 80%
59078.3	-20.5	i	21.8	_	< 50%
59095.2	-3.5	i	21.7	0.3	> 50%
58866.7	-232.1	z	21.6	_	< 50%
58883.7	-215.1	z	21.4	_	< 50%
58947.5	-151.2	z	21.1	_	< 50%
58969.4	-129.4	z	20.8	_	< 50%
58974.4	-124.3	z	20.7	0.3	> 50%
58984.3	-114.4	z	21.3	0.3	> 50%
59003.4	-95.3	z	20.4	_	< 50%
59009.4	-89.4	z	20.9	0.3	> 80%
59028.3	-70.5	z	21.6	_	< 50%
59033.3	-65.5	z	21.4	0.4	> 50%
59040.3	-58.5	z	21.1	0.3	> 80%
59064.3	-34.4	z	21.2	_	< 50%
59072.3	-26.5	z	21.3	0.4	> 50%
59093.2	-5.5	z	21.2	_	< 50%
59097.2	-1.5	z	20.7	0.2	> 80%

^aRelative to first light (MJD 59098.74)