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PSI FluorCAM protocol for Rapid Light Curve with far red pre-ilumination.

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ABSTRACT

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PROTOCOL CITATION

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PSI FluorCAM protocol for Rapid Light Curve with far red pre-ilumination.

1 Load the following script in to the FluorCam software

2 TS=50ms
;Rapid light curve in Actinic light 2 for TOMI-2
;version November 11, 2020
;with FilterWheel
;high-resolution CCD - TOMI-2
;estimated time: app. 372 s
;for successful measurement check Light curve settings manual
ADD1=0
Act2=0
Act1=0
;
include default.inc ;Includes standard options, do not remove it !
include light.inc ;Includes standard options, do not remove it !
include FW.inc ;Includes standard options, do not remove it !

Shutter=2
Sensitivity=30.6
Super=60
ADD2=10

__LightA=24.122
__LightB=-61.463

;3 = 10.903
;4 = 35.025
;5 = 59.147
;6 = 83.269
;7 = 107.391
;8 = 131.513
;9 = 155.635
;10 = 179.757
;15 = 300.367
;20 = 420.977
;25 = 541.587
;30 = 662.197
;35 = 782.807
;40 = 903.417

;These are the light intensities used for the Rapid light curve
I1 = 3
I2 = 3
I3 = 3
I4 = 3
I5 = 3
I6 = 3

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```
I7 = 3
I8 = 3
I9 = 3
I10 = 3
I11 = 4
I12 = 5
I13 = 6
I14 = 7
I15 = 8
I16 = 9
I17 = 10
I18 = 12
I19 = 17
I20 = 20
I21 = 25
I22 = 30
I23 = 35
I24 = 40
I25 = 45

__LightIntensity=
;_____
_____
;There is a pre-illumination phase with only far red light, followed by determination of Fo and
Fm
<0s>=>SET_FILTER(CHL)
Preillumination=60s
<0s>=>add2(Preillumination)
start = Preillumination;
;-------------------------------------------------------------------------------------------
;*** Fo Measurement
*********************************************************************************************
;-------------------------------------------------------------------------------------------
F0duration = 5s
F0measure = 1s
start + <0,F0measure..F0duration>=>mfmsub
start + <0s>=>checkPoint,"startFo"
start + =>checkPoint,"endFo"
;
;-------------------------------------------------------------------------------------------
;*** Saturating Pulse & Fm Measurement
*****************************************************************************
;-------------------------------------------------------------------------------------------
PulseDuration = 800ms;
Fmstart = start + F0duration+mfmsub_length
;
=>SI_Act2(I25)
```


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```
=>SatPulse(PulseDuration)
=>act2(PulseDuration)
Fmstart+<200ms, 200ms + mfmsub_length .. PulseDuration-mfmsub_length>=>mfmsub
;
=>checkPoint,"startFm"
=>checkPoint,"endFm"
=>checkPoint,"timeVisual"
;
;*** Actinic light Exposure ******************************
Pause = 2*TS
ALduration = 30s
ALmeasure = ALduration/6
;Protocol contains 5 minutes of illumination with low light in order to keep photosynthesis
active while samples are brogth to target temperatures by the thermocycler
ALstart1 = Fmstart + PulseDuration + Pause
ALstart2 = ALstart1 + ALduration + Pause
ALstart3 = ALstart2 + ALduration + Pause
ALstart4 = ALstart3 + ALduration + Pause
ALstart5 = ALstart4 + ALduration + Pause
ALstart6 = ALstart5 + ALduration + Pause
ALstart7 = ALstart6 + ALduration + Pause
ALstart8 = ALstart7 + ALduration + Pause
ALstart9 = ALstart8 + ALduration + Pause
ALstart10 = ALstart9 + ALduration + Pause
;this is where the Light Curve starts
ALstart11 = ALstart10 + ALduration + Pause
ALstart12 = ALstart11 + ALduration + Pause
ALstart13 = ALstart12 + ALduration + Pause
ALstart14 = ALstart13 + ALduration + Pause
ALstart15 = ALstart14 + ALduration + Pause
ALstart16 = ALstart15 + ALduration + Pause
ALstart17 = ALstart16 + ALduration + Pause
ALstart18 = ALstart17 + ALduration + Pause
ALstart19 = ALstart18 + ALduration + Pause
ALstart20 = ALstart19 + ALduration + Pause
ALstart21 = ALstart20 + ALduration + Pause
ALstart22 = ALstart21 + ALduration + Pause
ALstart23 = ALstart22 + ALduration + Pause
ALstart24 = ALstart23 + ALduration + Pause
ALstart25 = ALstart24 + ALduration + Pause
;
=>SI_Act2(I1)
=>SI_Act2(I2)
=>SI_Act2(I3)
=>SI_Act2(I4)
=>SI_Act2(I5)
=>SI_Act2(I6)
```


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```
=>SI_Act2(I7)
=>SI_Act2(I8)
=>SI_Act2(I9)
=>SI_Act2(I10)
=>SI_Act2(I11)
=>SI_Act2(I12)
=>SI_Act2(I13)
=>SI_Act2(I14)
=>SI_Act2(I15)
=>SI_Act2(I16)
=>SI_Act2(I17)
=>SI_Act2(I18)
=>SI_Act2(I19)
=>SI_Act2(I20)
=>SI_Act2(I21)
=>SI_Act2(I22)
=>SI_Act2(I23)
=>SI_Act2(I24)
=>SI_Act2(I25)
;
ALstart =
ALstart => act2(ALduration)
;
;******* Kautsky Effect Measurement **********************************
;
;ALstart + TS => mfmsub
ALstart#=>mfmsub
;
;******************* Ft'& Fm' definition **********************************
PulseLStart = ALduration - PulseDuration - mfmsub_length
;
FtL = ALstart + PulseLStart - PulseDuration
FtL#=>mfmsub
;
PulseL = ALstart + PulseLStart
PulseL - TS=> SI_Act2(I25)
PulseL=>SatPulse(PulseDuration)
PulseL#<200ms, 200ms + mfmsub_length .. PulseDuration-mfmsub_length>=>mfmsub
;
Last = ALstart25+ALduration+2*mfmsub_length
Last + <0s, 1s .. 5s>=>mfmsub
;----------------------------------------------------------
;
=>checkPoint,"startFm_Lss1"
=>checkPoint,"endFm_Lss1"
;
=>checkPoint,"startFm_Lss2"
```


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```
=>checkPoint,"endFm_Lss2"
;
=>checkPoint,"startFm_Lss3"
=>checkPoint,"endFm_Lss3"
;
=>checkPoint,"startFm_Lss4"
=>checkPoint,"endFm_Lss4"
;
=>checkPoint,"startFm_Lss5"
=>checkPoint,"endFm_Lss5"
;
=>checkPoint,"startFm_Lss6"
=>checkPoint,"endFm_Lss6"
;
=>checkPoint,"startFm_Lss7"
=>checkPoint,"endFm_Lss7"
;
=>checkPoint,"startFm_Lss8"
=>checkPoint,"endFm_Lss8"
;
=>checkPoint,"startFm_Lss9"
=>checkPoint,"endFm_Lss9"
;
=>checkPoint,"startFm_Lss10"
=>checkPoint,"endFm_Lss10"
;
=>checkPoint,"startFm_Lss11"
=>checkPoint,"endFm_Lss11"
;
=>checkPoint,"startFm_Lss12"
=>checkPoint,"endFm_Lss12"
;
=>checkPoint,"startFm_Lss13"
=>checkPoint,"endFm_Lss13"
;
=>checkPoint,"startFm_Lss14"
=>checkPoint,"endFm_Lss14"
;
=>checkPoint,"startFm_Lss15"
=>checkPoint,"endFm_Lss15"
;
=>checkPoint,"startFm_Lss16"
=>checkPoint,"endFm_Lss16"
;
=>checkPoint,"startFm_Lss17"
=>checkPoint,"endFm_Lss17"
;
```


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```
=>checkPoint,"startFm_Lss18"
=>checkPoint,"endFm_Lss18"
;
=>checkPoint,"startFm_Lss19"
=>checkPoint,"endFm_Lss19"
;
=>checkPoint,"startFm_Lss20"
=>checkPoint,"endFm_Lss20"
;
=>checkPoint,"startFm_Lss21"
=>checkPoint,"endFm_Lss21"
;
=>checkPoint,"startFm_Lss22"
=>checkPoint,"endFm_Lss22"
;
=>checkPoint,"startFm_Lss23"
=>checkPoint,"endFm_Lss23"
;
=>checkPoint,"startFm_Lss24"
=>checkPoint,"endFm_Lss24"
;
=>checkPoint,"startFm_Lss25"
=>checkPoint,"endFm_Lss25"
;
;****************** Ft' definition *********************************
;
=>checkPoint,"startFt_Lss1"
=>checkPoint,"endFt_Lss1"
;
=>checkPoint,"startFt_Lss2"
=>checkPoint,"endFt_Lss2"
;
=>checkPoint,"startFt_Lss3"
=>checkPoint,"endFt_Lss3"
;
=>checkPoint,"startFt_Lss4"
=>checkPoint,"endFt_Lss4"
;
=>checkPoint,"startFt_Lss5"
=>checkPoint,"endFt_Lss5"
;
=>checkPoint,"startFt_Lss6"
=>checkPoint,"endFt_Lss6"
;
=>checkPoint,"startFt_Lss7"
=>checkPoint,"endFt_Lss7"
;
```


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```
=>checkPoint,"startFt_Lss8"
=>checkPoint,"endFt_Lss8"
;
=>checkPoint,"startFt_Lss9"
=>checkPoint,"endFt_Lss9"
;
=>checkPoint,"startFt_Lss10"
=>checkPoint,"endFt_Lss10"
;
=>checkPoint,"startFt_Lss11"
=>checkPoint,"endFt_Lss11"
;
=>checkPoint,"startFt_Lss12"
=>checkPoint,"endFt_Lss12"
;
=>checkPoint,"startFt_Lss13"
=>checkPoint,"endFt_Lss13"
;
=>checkPoint,"startFt_Lss14"
=>checkPoint,"endFt_Lss14"
;
=>checkPoint,"startFt_Lss15"
=>checkPoint,"endFt_Lss15"
;
=>checkPoint,"startFt_Lss16"
=>checkPoint,"endFt_Lss16"
;
=>checkPoint,"startFt_Lss17"
=>checkPoint,"endFt_Lss17"
;
=>checkPoint,"startFt_Lss18"
=>checkPoint,"endFt_Lss18"
;
=>checkPoint,"startFt_Lss19"
=>checkPoint,"endFt_Lss19"
;
=>checkPoint,"startFt_Lss20"
=>checkPoint,"endFt_Lss20"
;
=>checkPoint,"startFt_Lss21"
=>checkPoint,"endFt_Lss21"
;
=>checkPoint,"startFt_Lss22"
=>checkPoint,"endFt_Lss22"
;
=>checkPoint,"startFt_Lss23"
=>checkPoint,"endFt_Lss23"
```


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```
;
=>checkPoint,"startFt_Lss24"
=>checkPoint,"endFt_Lss24"
;
=>checkPoint,"startFt_Lss25"
=>checkPoint,"endFt_Lss25"

;
;
;END ****************************************************************
```


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