

Creating isochrones using TA-DA

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Instructions for how to use the IDL program TA-DA to generate photometry for isochrones from synthetic spectra

Home page: [TA-DA - A Tool for Astrophysical Data Analysis

<https://users.astro.ufl.edu/~ndario/TADA/index.html>

- Manual: https://users.astro.ufl.edu/~ndario/TADA/downloads/tada_manual.pdf
- Paper: <https://iopscience.iop.org/article/10.1088/0004-6256/144/6/176>
- [Website appears permanently down; see dropbox for necessary files]

Steps:

- Launch UVA Remote Desktop
 - Remote desktop access instructions:
https://virginia.service-now.com/its/?id=itsweb_kb_article&sys_id=f9dc08eddb1d1380f032f1f51d96192d
 - Remote desktop has IDL installed with requisite licenses
- Transfer files to remote desktop using OneDrive
 - Remote desktop already has OneDrive installed for cloud based file transfer
 - Set up One Drive on my laptop to be able to retrieve isochrones:
https://virginia.service-now.com/its/?id=itsweb_kb_article&sys_id=2b0ebf45db20d304f032f1f51d9619c6
 - Added file folder “tada_data” and file “tada.sav” (downloaded from TA-DA website) to my local OneDrive folder, waited until it synced to remote desktop
- Launch IDL and open TA-DA
 - In IDL navigated to OneDrive folder’s directory
 - IDL command: `cd,/path/`
 - Launched TA-DA
 - IDL command: `tada`
 - Will open a widget which is the program
 - Instructions on how to navigate widget are in manual linked above
 - For following steps, using example parameters as used for O’Neill+ 2021 (NGC 602)
- Select tab “Evolutionary Models”
 - Select “Evolutionary models” option
 - Choose evolutionary model: Pisa PMS (mediumY, ML1.20, XD4E5)
 - Meaning: $Y = 0.254$, $\text{Alpha} = 1.2$, X_D (initial abundance of D) = 4×10^{-5}
 - Choose metallicity $[M/H] = -0.7$

- Select “Specific Isochrones”
 - List desired ages - ex. 0.5 through 5.5 Myr in 0.5 Myr steps
- Click submit

- Select tab “Synthetic Photometry”
 - Select Atmosphere models: “Kurucz”
 - These are Kurucz (1993) models
 - Metallicity: -0.5
 - Allow extrapolation for log g if needed
 - Reddening Law: Cardelli (1989)
 - Input $A_v = 0.25$
 - Input $R_v = 3.1$
 - Distance modulus: 18.91 mag
 - Select photometric bands to perform photometry:
 - Instrument: ACSWFC
 - Add bands: ex: “F555W” and “F814W”
 - Click submit

- Plot window launches automatically
 - Can plot 555 - 814 vs 555, etc to visually confirm that worked
 - Close window

- Select tab “Synthetic photometry results”
 - Select units for synthetic photometry: Vegamag
 - Click “save synthetic photometry to file” and save to OneDrive as .txt
 - File includes: Teff, luminosity, mass, age, g, radius, 555 and 814 magnitudes
 - Retrieve file on your local machine