

Find all galaxies with a deVaucouleurs profile ($r\hat{A}$? falloff of intensity on disk) and the photometric colors consistent with an elliptical galaxy

This query will be a full table scan on the Object table.

```
SELECT *
FROM   Object
WHERE  extendendess > 0.8 -- is galaxy
      AND ( ( r-i - (g-r)/4 - 0.18 ) BETWEEN -0.2 AND 0.2 )
      AND ( ( r-i - (g-r)/4 - 0.18) > (0.45 - 4* (g-r) ) )
      AND ( g-r > ( 1.35 + 0.25 * r-i ) )
      AND flags ...
```

Note that:

- $g = \text{fluxToAbMag}(g\text{Flux_SG})$
- $r = \text{fluxToAbMag}(r\text{Flux_SG})$
- $i = \text{fluxToAbMag}(i\text{Flux_SG})$

Todo: rework flags.

This query originally came from SDSS (S-5):

```
declare @binned      bigint;                -- initialized "binned" literal
set      @binned =  dbo.fPhotoFlags('BINNED1') + -- avoids SQL2K optimizer problem
          dbo.fPhotoFlags('BINNED2') +
          dbo.fPhotoFlags('BINNED4') ;

declare @blended     bigint;                -- initialized "blended" literal
set      @blended =  dbo.fPhotoFlags('BLENDED'); -- avoids SQL2K optimizer problem

declare @noDeBlend   bigint;                -- initialized "noDeBlend" literal
set      @noDeBlend =  dbo.fPhotoFlags('NODEBLEND'); -- avoids SQL2K optimizer problem

declare @child       bigint;                -- initialized "child" literal
set      @child =    dbo.fPhotoFlags('CHILD'); -- avoids SQL2K optimizer problem

declare @edge        bigint;                -- initialized "edge" literal
set      @edge =     dbo.fPhotoFlags('EDGE'); -- avoids SQL2K optimizer problem

SELECT  objectId
FROM    Galaxy AS G -- count galaxies
WHERE   ln1Dev_r > log(.1) + ln1Exp_r -- red DeVaucouler fit likelihood greater than disk fit
      AND ln1Exp_r > 0 -- exponential disk fit likelihood in red band > 0
      -- Color cut for an elliptical galaxy courtesy of James Annis of Fermilab
      AND (G.flags & @binned) > 0
      AND (G.flags & ( @blended + @noDeBlend + @child)) != @blended
      AND (G.flags & (@edge + @saturated)) = 0
      AND G.petroMag_i > 17.5
      AND (G.petroMag_r > 15.5 OR G.petroR50_r > 2)
      AND (G.petroMag_r < 30 AND G.g < 30 AND G.r < 30 AND G.i < 30)
      AND ((G.petroMag_r - G.extinction_r) < 19.2
      AND ((G.petroMag_r - G.extinction_r) < (13.1 + -- deRed_r < 13.1 +
          (7/3)* G.grColor + -- 0.7 / 0.3 * deRed_gr
          4 * G.riColor - 4 * 0.18 )) -- 1.2 / 0.3 * deRed_ri
      AND (( G.riColor - G.grColor/4 - 0.18) BETWEEN -0.2 AND 0.2 ) )
      OR (
          ((G.petroMag_r - G.extinction_r) < 19.5 )
          AND (( G.riColor - G.grColor/4 -.18) > -- - deRed_gr/4 - 0.18 -- cperp = deRed_ri
              (0.45 - 4* G.grColor )) -- 0.45 - deRed_gr/0.25
          AND (G.grColor > ( 1.35 + 0.25 * G.riColor ) )
      )
)
```

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