

HOW MANY BURSTS OF STAR FORMATION IN M82?

B.P. Artamanov¹, P. Traat²
 1 Sternberg Astronomical Institute Universitetskij
 Prospekt 13, 119899 Moscow, U.S.S.R.
 2Tartu Astronomical Observatory
 202444 Tõravere, Estonia

1. Introduction

The galaxy M82 has in its central region ongoing a giant burst of star formation. Van den Bergh (1971) first separated the bright semistellar objects in central region of M82, which in fact are young star clusters. Using subsecond seeing, Artamonov et al. (1990) managed to distinguish about 70 semistellar objects in M 82 in colour 'V'.

We have made estimates of the influence of different starbursts on the composite colour index of M 82 disk, using for the old disk component the "classical" models of photometric evolution with monotonically decreasing SFR from Traat (1988). Model data: $Z = 0.03$, power-law IMF with index $n = 2.3333$, stellar mass limits: $0.085M_{\odot} \div 100M_{\odot}$, young population formed in a single burst. The underlying old disk has been taken to have the age of 10^{10} yr. The brightness of young star clusters, formed in SF bursts, (L_1), was supposed to have different weights x relative to the brightness of the old disk, L_0 , with the total brightness L being the sum of both: $L = L_0 + L_1$, $L_1 = x \cdot L_0$, $L = L_0(1 + x)$.

The table presents composite colours for star bursts of different ages t_{burst} and strengths x .

x	1.5	0.9	0.5	0.1	t_{burst}
$U - B/B - V$	-0.66/ + 0.45	-0.47/ + 0.59	-0.24/ + 0.74	+0.33/ + 0.96	10^6
$U - B/B - V$	-0.34/ + 0.54	-0.22/ + 0.67	-0.02/ + 0.77	+0.48/ + 0.97	$10^7 yrs$
$U - B/B - V$	+0.15/ + 0.64	+0.26/ + 0.74	+0.36/ + 0.85	+0.58/ + 0.98	$10^8 yrs$

Different areas of disk of M82 have the following mean U-B/B-V colors: A (nuclear region of M82) - 0.45/1.10; B (middle part of the disk) - 0.15/0.85 (Artamonov (1978), Bronkalla et al (1980)). Extinction in the centre of M 82 is approximately $A_v \sim 5^m$, in area B — $0^m.5 \div 1^m.0$.

From these colors, depending on the extinction, one gets for the burst population the limits for both areas A and B: $t_{burst} = 10^7 - 10^8$ yr, $x = 0.9 \div 1.5$. It is possible that the multiple SF bursts have been occurred in M82, but the rough estimates of burst ages doesn't allow to draw firm conclusions yet. We believe that detailed photometry of semistellar objects in M82 will help to solve this problem.

Artamonov B.P., 1978, Soviet Astr., 22, 7

Artamonov B.P., Novikov S.B., Shokin Ju.A., 1990, preprint 17 Sternberg Inst., Moscow

Bronkalla W., Notni P., Tiersch H.1980Astron. Nachr. 301, 217

Traat P., 1988, Tartu Astrof. Obs. Teated No., 91, 23

Van den Bergh S., 1971, A&A, 12, 474