THE BARRED GALAXY NGC 7741

M.F. Duval
Observatoire de Marseille
2 Place Le Verrier
13248 Marseille Cedex 4   (France)

The type of this galaxy (SB(s)cd) is intermediate between symmetrical early type galaxies and asymmetric late-type barred spirals. Three different components are clearly seen: a bar (B), a central disk (c) and an extended disk (d).

The centre of the central disk is approximately coincident with the centre of the stellar continuum detected in the bar but does not correspond with the geometrical centre of the bar (Fig. 1).

The interior of the central disk is bordered by an oval distribution of HII regions (Fig. 4).
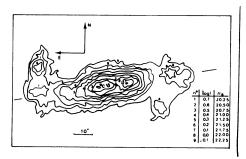

Fig. 1. +: stellar continuum centre
       C: geometrical centre

Fig. 2. isophotal map in blue light

From a surface photometry study in blue light (Fig. 2), we derive the geometrical parameters of the different components:

	position of the major axis	$< b/a > = q$
bar	$98° \pm 2°E$	0.30 ± 0.02
central disk	$160° \pm 3°E$	0.71 ± 0.03
extended disk	$160° \pm 5°E$	0.68 ± 0.03

and their intrinsic luminosity distribution:

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bar $I_B = 4.3(1-(r*/0.32)^2)^{72}$ $I_{oB} = 422 \ L_\odot pc^{-2}$

central disk: $I_c = 0.45(1-(r*/1.8)^2)^{32}$ $I_{oc} = 44 \ L_\odot pc^{-2}$

extended disk: $\log I_d = -0.5 \ -0.611 \ r*$ $I_{od} = 31 \ L_\odot pc^{-2}$

These laws give: $L_B/L_T = 0.09$, $L_c/L_T = 0.56$, $L_d/L_T = 0.31$; we obtain

for the bright inner arm: $L_a/L_T = 0.04$. The luminosity of the bar in

this galaxy is principally dominated by strong HII regions.
The velocity field has been obtained from spectra and interferograms.
It shows strong deviations with respect to the velocities expected from
an axially symmetric mass distribution as it can be seen on the "rota-
tion curves" drawn along the major axis of the galaxy and along the ma-
jor axis of the bar (Fig. 3). Otherwise, two zones of constant radial ve-
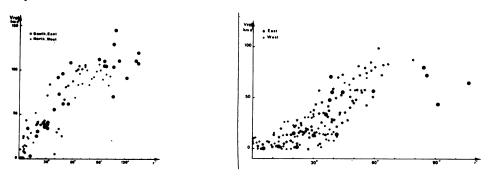locity are observed at 20" to the north and south of the centre of the bar.

Figure 3. "rotation curves"
   major axis of the galaxy   major axis of the bar
Ocircled points are obtained from 2 interferograms,✱and ● from 6 spectra

Using Toomre's models for the determination of the central disk and
extended disk masses we obtain, after correction for galactic and
internal absorption, the following M/L ratios:
bar + central disk $M/L \simeq 1h^{-1} \ M_\odot/L_\odot$

extended disk + halo $M/L \simeq 30h^{-1} \ M_\odot/L_\odot$

(distance adopted: 10 Mh pc with $h = 100/H \ km \ s^{-1} \ Mpc^{-1}$)

Fig. 4

Hα photograph taken by
J.Boulesteix, G.Courtĕs,
H.Petit at the prime focus of
the 6m telescope at Zelenchus-
kaya equiped with a focal re-
ducer and a image tube. 15min
exposure. FWHM of the filter
6 Å.