I. SPECTRAL LINE SHAPES INVESTIGATIONS IN YUGOSLAVIA AND SERBIA 1993-1997

Three previously published Bibliographies with citation index on Spectral Line Shapes Investigations in Yugoslavia, cover the period 1962 - 1993 (Dimitrijević, 1990, 1991, 1994). From the September of 1993 up to the March of 1997, 261 articles concerning line shapes investigations have been published by Yugoslav (Serbian) authors. In Serbia have been defended as well 2 Ph. D. and 9 M. Sc. Theses. Consequently, since the first article on this topic (Vujnović et al., 1962) up to the March 1997, 1129 (926 by serbian authors) bibliographic items have been published by 146 Yugoslav authors(119 from Serbia, 26 from Croatia and 1 living in France).

In the considered period various problems have been investigated. Stark broadening of hydrogen and hydrogen-like emitter lines, has been studied in particularly for He II line shapes (924, 1007), and hydrogen line shift due to magnetization of moving plazma (918, 1040). Also, the attention has been paid to the study of H beta line shapes in the presence of a D.C.magnetic field (996, 1083-1085), to the investigation of hydrogen line shapes in a plane - cathode abnormal glow discharge (926, 1128, 1038), radio - frequency discharges (1029) and other discharges (874, 875, 1113, 1114, 1119-1121), the boundary layer influence on low n Balmer lines (1036) and to the influence of ion dynamics (1034).

Work on the experimental determination of Stark broadening parameters of nonhydrogenic atoms and ions has been continued during the considered period: Stark broadening of folowing atoms and ions has been investigated: Ar I (869, 932, 947, 994, 1033, 1082, 1087, 1088), Ar III (993, 1076, 1118), Cd II (994, 1019), Cu I (1031), F V (959), Fe I (1032), He I (885, 1094, 1095), Hg I (873), Na I (873, 950, 961, 1116), N II (945, 946, 1097), N III (958, 1018, 1097), N IV (1097, 1098), Ni I, II (917, 1032, 1091, 1099, 1117), O III (1081), O IV (889, 890, 923, 956, 957, 958, 960, 1006), S III (974, 1049), Si I (873, 1091, 1099). Also, the influence of ion dynamics (927-931, 1009-1013, 1015-1017, 1030, 1092, 1093, 1096), temperature dependence (889, 923, 956, 1006, 1082, 1087), departure from LS coupling (890) and Li- (1042, 1045), Be- (1043, 1045), and B-isoelectronic sequence (956, 957, 1042, 1044, 1046) have been investigated (1125).

Using the semiclassical perturbation approach (Sahal-Bréchot, 1969a,b), the spectra of following elements have been investigated: Be I (878, 905), Mg I (900, 901, 912, 913, 986, 989, 991, 1052, 1072), Al I (904), Rb I (907-909, 981), Se I (1060, 1069, 1070), Sr I (1056, 1057, 1060, 1062), Ba I (1059, 1071, 1125), Li II (978, 979, 985, 1055), Mg II (980, 988, 1064, 1073, 1127), Fe II (962, 967, 969), Ni II (963, 964, 973), Ba II (1059, 1068, 1125), B III (1058, 1063, 1065, 1126), Be III (1053, 1058, 1065), S III (974, 1049), Al III (879, 895), C IV (880), O IV (902, 977, 984), P IV (1061, 1067), S IV (974, 1049), C V (987, 990, 1051, 1074), O V (902, 976, 977), P V (975, 990, 1052), F VII (877), Ne VIII (897, 903, 911), Na IX (897, 911, 914, 983), Al XI (906, 910, 915, 982) and Si XII (899, 906, 910). The influence of oscillator strength values on Stark broadening parameters has been investigated (981) as well.

When it is not possible to use the semiclassical perturbation approach with the appropriate accuracy due to the lack of reliable atomic data, the modified semiempirical method (Dimitrijević and Konjević, 1980) and other approximate methods have been applied. Such methods have been investigated in (992, 1008, 1037) as well as the case of the complexity of radiator in Refs. (876, 1100, 1020). The modified semiempirical approach has been applied to the lines of Sc II (1102, 1105), Bi II (896), Cd II (882), I II (1101), As II (937, 1101), Zn II (882), Br II (1101), Sb II (936, 1101), Y II (1102, 1105), Zr II (1102, 1105), Kr II (1104), Xe II (938, 1103), Zn III (1107), Ge III (1108), As III (1020), Se III (1020) and Cu IV (895).

A special attention has been paid in a number of papers to the investigation of regularities and systematic trends of Stark broadening parameters (871, 872, 883, 884, 1025-1028, 1078, 1079, 1110). Similarities of Stark broadening parameters within spectral series (943, 1027, 1028) have been investigated as well as systematic trends for the same type of transition within a homologous (871, 872), isonuclear (1078, 1079) and isoelectronic sequence (1077). By using regularities and systematic trends, Stark broadening parameters of the following emitters have been predicted: Mg I, Mg II (1112), N V, O VI, S VI, (944), Fe I, Fe II, Fe III, Fe IV, C IV, Si IV (884), Na IX - Ti XX (1080) and doubly-charged ion off-resonances (1111).

Astronomical aspects of spectral line shapes research were studied in a number of publications, as optical depths of the formation of Fraunhofer lines (999), microturbulent sensitivity of solar spectral lines (1089), Mg II h and k lines in spectra of alpha Orionis (1003), IM Pegasi and HR 7275 (1024), IUE spectra of mu Cephei (920-922, 1004), Fourier analysis of rotationally broadened stellar spectra (1002), and Stark broadening parameters for Solar and stellar plasma research (916) and for hot star spectra investigation (893, 894, 934, 935, 939, 940, 965, 968, 971, 972, 1055). On Astronomical Observatory in Belgrade the Belgrade programme for monitoring of activity - sensitive spectral lines of the Sun as a star, during a 11-years Solar cycle is in the course of realization. In accordance with this programme Solar activity influence on spectral lines, as well as the influence of photospheric parameters on such spectral lines has been investigated in several papers (919, 997, 998, 1123, 1124). Due to need to obtain a better connection between astronomical observations and theoretical interpretations of astrophysical spectra, the radiative transfer investigations have also been carried out (888, 954, 1115). Moreover, the influence of the gravitational field on the shape of spectral lines of Seyfert galaxies and quasars (887, 941, 942, 1023) has been studied as well. The work on the formation of a Data Base for the Active Galactic Nuclei (AGN) spectral lines is also in course (1101, 1022).

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