Appendix B

Table B-1: Overview of IECF devices from different Institutions. All dimensions in [mm], indicated by Ø -diameter, L-length, H-height, t-thickness. Material: SS-stainless steel, Al-aluminium, Ti-titanium, Mo-molybdenum. Other abbreviations: GD - Glow Discharge (for plasma ignition); AGD – Assisted Glow Discharge (the specific mechanism is specified in the column "Assist Mechanism").

#	# Dev.	Institution	Specific Name	Device Type	Assist Mechanism	Fusion Fuel	Vacuum Chamber	Anode	Cathode	Power Supply/ Pressure	Max. Fusion Performance	Source
1	1	ITT Farnsworth Research Corporation	-	Beam-Beam; DC; Spherical	6 Ion Guns	DT	Spherical; Ø178; SS	Spherical; Ø171.45; SS	Ø114; SS/Al	150 kV; 60 mA	3E9 n/s; (150 kV; 10 mA)	[1], [2]
2						DD					5E7 n/s	
3		Brigham Young University (BYU)				DD					2.4 n/s	[3], [4]
4	2	University of Illinois at Urbana-Champaign (UIUC)	IEC-A	GD; DC; Spherical	-	DD	Spherical; Ø300, t4.8; SS304	Vac. Chamber	Spherical Wire Grid; Ø37/75; t0.8/1.04/1.3; SS T302/304	80 kV	1.2E6 n/s; (70 kV; 15 mA)	[5], [6]
5	3		N-Device	AGD; DC; Spherical	External Ion Beam Source (13.56 MHz; 100 W)	DD	Spherical; Ø550	Vac. Chamber	Spherical; Ø100; W-Re	100 kV; 50 mA	2E7 n/s; (75 kV; 15 mA; 1.2 mTorr)	[7]–[9]
6	4		C-Device	GD; DC; Linear	-	DD	Cylindrical; Ø100xL610; Glass	Concave Reflector	Cylindrical; Ø90xL100	n.a.	1E6 n/s; (60 kV; 20 mA)	[6]
7	5		-	GD; Pulsed; Spherical	-	DD	Spherical; Ø610	Vac. Chamber	Spherical; Ø254	n.a.	8E8 n/s; (50 keV; 17 A)	[10]
8	6	Los Alamos National Laboratory (LANL)	The Los Alamos Intense Neutron Source (INS-e)	AGD; DC; Spherical; Triple Grid	External Ion Source	DD	Spherical; Ø279.4	Spherical; Ø254	Spherical; Ø76.2	75 kV; 335 mA; ca. 1E-4 Torr	8E5 n/s; (40 kV; 30 mA; 7E-4 Torr)	[11]

#	# Dev.	Institution	Specific Name	Device Type	Assist Mechanism	Fusion Fuel	Vacuum Chamber	Anode	Cathode	Power Supply/ Pressure	Max. Fusion Performance	Source
9	7	Idaho National Engineering Laboratory (INL)	INEL Device	GD; DC; Spherical	-	DD	Spherical; Ø250	Vac. Chamber	Spherical; approx. Ø60	75 kV; 33 mA	3E5 n/s; (50 kV; 9 mTorr)	[12]
10	8	University of Missouri Colombia (UM)	-	GD; DC; Spherical	-	DD	n.a.	Spherical; Ø508	Spherical	n.a.	1.36E6 n/s; (24 kV; 29 mA; 0.35 mTor)	[13]
11	9	University of Wisconsin-Madison (UW)	Homer	AGD; DC; Spherical	Thermionic Filaments	DD	Cylindrical; Ø910xL660; Al; Water-cooled	Spherical Wire Grid; Ø500; t1.52	Spherical Wire Grid; Ø200; t0.76	300 kV; 200 mA 0.2-1.7 Torr	3.8E8 n/s; (200 kV; 100 mA; 1 mTorr)	[14]
12				AGD; Pulsed; Spherical		DD		Spherical Wire Grid; Ø400; SS	Spherical Wire Grid; Ø200	120 kV; 6 A	4.7E9 n/s; (120 kV; 4.8 A)	[15]
13				AGD; DC; Spherical		DH3		Spherical Wire Grid; Ø500	Spherical Wire Grid; Ø100; W-Re	200 kV; 75 mA	2.1E7 p/s (80 kV; 30 mA; 2 mTorr)	[16], [17]
14	10		The Six Ion Gun Fusion Experiment (SIGFE)	Beam-Beam; DC; Spherical	6x Focused Ion Guns	DD	Cylindrical; Ø460xH460; SS	Anode part of ion guns	Spherical; Ø110	150 kV; 30 mA; 5-270 mPa	4.3E7 n/s; (130 kV; 10 mA; 27 mPa)	[2]
15						DH3					n.a.	
16	11		Helios	AGD; DC; Spherical	Helicon Plasma Source (13.56 Mhz; 1.4 kW)	DD	Spherical; Ø610; SS; Water-cooled	Vac. Chamber	Spherical; Ø100; W/W-Re	185 kV; 75 mA	1E7 n/s	[18]–[21]
17						He3He3					1.1E3 p/s; (135 kV; 7 mA)	
18	12		3HeCTRE	AGD; DC; Spherical	Thermionic Filaments	DD	Cylindrical; Ø460xH460; SS	Cylindrical; Ø270xH380; SS	Spherical; Ø100; t0.76; W-Re	150 kV; 35 mA	2.7E7 n/s (145 kV; 35 mA; 0.3 Pa)	[20], [22]
19						DHe3					2E7 p/s (130 kV; 30 mA; 0.3 Pa)	
20	13	Tokyo Institute of Technology	Radially Convergent Beam Fusion (RCBF)	AGD; Pulsed; Cylindrical	Cusp Magnetic Field	DD	Cylindrical; Ø393xH340; SS	Cylindrical; Ø200xH320; t1; SS	Cylindrical; Ø40xH380; t1; SS	100 kV;15 A; 200 Hz; 0.1-10 Pa	7.4E9 n/s; (80 kV; 15 A; 1 Pa)	[23]

#	# Dev.	Institution	Specific Name	Device Type	Assist Mechanism	Fusion Fuel	Vacuum Chamber	Anode	Cathode	Power Supply/ Pressure	Max. Fusion Performance	Source
21	14		-	GD; Pulsed; Spherical	-	DD	Cylindrical; Ø450xH310; SS	Spherical; Ø300; SS	Spherical; Ø70; t1.2; SS	90 kV; 10 A; 1-15 mTorr	2E8 n/s; (51 kV; 7.3 A; 12.5 mTorr)	[24]
22	15		-	GD; DC; Linear	-	DD	Cylindrical; Alumina		Ring; Øi80; Øa100xL100	150 kV; 20 mA; ca. 1 Pa	3.4E6 n/s; (95 kV; 20 mA; 0.5 Pa)	[25]
23	16		Coaxial double cylindrical device	GD; DC; Cylindrical	-	DD	Cylindrical with central channel; Øa850; Øi370xL790	n.a.	n.a.	45 kV; 60 mA	1.5E6 n/s; 45 kV; 60 mA	[26]
24				GD; Pulsed; Cylindrical	-	DD				n.a.	1.07E8 n/s; (38 kV; 5 A; 18 µs)	[26]
25	17	Tokai University	-	GD; DC; Spherical	-	DD	Cylindrical; Ø200xH400; SS	Spherical; Ø100; t2; SS	Spherical ring wires; Ø25; t1; SS	30 kV; 40 mA; 0.35-0.75 Pa	ca. 5E4 n/s; (30 kV; 40 mA)	[27]
26	18	Kyoto University	-	GD; DC; Spherical	-	DD	Spherical; Ø170; Ti; Water-cooled	Vac. Chamber	Spherical; Disc-shaped; Ø60, t0.3; η0.98; Mo	120 kV; 300 mA;- 1-3 Pa	9.2E7 n/s; (80 kV; 80 mA)	[28]
27	19		-	GD; DC; Spherical	-	DHe3	Spherical; Ø340	Vac. Chamber	Spherical; Disc-shaped; Mo	125 kV; 30 mA	n.a.	[29]–[31]
28	20	Kansai University	-	GD; DC; Spherical	-	DD	Cylindrical; Ø300 x H600; Water-cooled	Spherical; Ø300	Spherical; Ø70; Mo	80 kV; 50 mA; 0.7-4 Pa	2.3E6 n/s; (60 kV; 40 mA)	[32]
29	21		-	AGD; Pulsed; Spherical	RF Antenna (13.56 MHz, 3 kW)	DD	Cylindrical; Ø500 x H750	Spherical; Ø300	Spherical; Ø65; Mo	70 kV; 100 A; Peak 6 to 9 µs, <1 kHz	6E7 n/s; 45 kV; 12 A; 1 Pa	[33]
30	22		-	GD; DC; Spherical	-	DT	Spherical; Ø250; SUS305; Water-cooled	Vac. Chamber	Spherical; Ø80; Mo	90 kV; 60 mA	8E5 n/s; (35 keV; 1.5 Pa)	[34]
31	23	Nihon University	-	AG; DC; Linear	External Magnetic Field	DD	Cylindrical	Vac. Chamber	Ring; Øi26; Øa36xL10	50 kV; 36 mA	n.a.	[35]
32	24	University of Sydney	-	AG; DC; Spherical	Thermionic Filaments	DD	Cylindrical; Ø300xH300; SS	Vac. Chamber	Spherical; Disc-shaped; Ø100, η0.80; Graphite/SS	50 k; 6 mA; 2E-5 - 5E-3 Torr	1E5 n/s	[36]

#	# Dev.	Institution	Specific Name	Device Type	Assist Mechanism	Fusion Fuel	Vacuum Chamber	Anode	Cathode	Power Supply/ Pressure	Max. Fusion Performance	Source
33	25	Eindhoven University of Technology	-	GD; DC; Spherical	-	DD	Spherical; Ø500; SS; water-cooled	Vac. Chamber	Various configurations	120 kV; 100 mA; 0.16 – 10 Pa	7E6 n/s; 85 kV; 0.42 Pa	[37], [38]
34	26	Technical University of Denmark	DTU Fusor	GD; DC; Spherical	-	DD	Cylindrical; Ø356 x H555; t3.3; SS	Vac. Chamber	Spherical; “Soccer” structure; Ø80; t1; η0.93; Ti	60 kV; 25 mA; 0.001 - 0.1 mbar	5E5 n/s; 30 kV; 25 mA; 5E-3 mbar	[39]
35	27	Centre of Plasma Physics-Institute for Plasma Research	-	GD; DC; Cylindrical	-	DD	Cylindrical; Ø500xL300	Vac. Chamber	Cylindrical; Ø30xL250; η0.92	90 kV; 20 mA;- 6E-3-1.5E-3 Torr	1E7 n/s; (90 kV; 20 mA); 1.5E-3 Torr	[40]
36	28		-	GD; Pulsed; Cylindrical	-	DD	Spherical; Ø400; SS	Vac. Chamber	Spherical Wire Grid; Ø100; η0.95	n.a.	n.a.; (75 kV; 1200 kW Peak (5µs))	[41]
37	29	Bhabha Atomic Research Centre	-	GD; DC; Spherical	-	DD	Cylindrical; Ø300xL450; SS	Spherical wire grid; Ø120; t1.5; SS304L	Spherical wire grid; Ø40; t1.5; SS304L	80 kV; 60 mA; 0.01-0.02 mbar	1E5 n/s; (24 kV; 0.02 mbar)	[42]
38	30	Nuclear Science and Technology Research Institute, Tehran	IR-IECF Device	GD; DC; Spherical		DD	Cylindrical; Ø600xL600; SS	Spherical wire grid; Ø410; SS	Spherical wire grid; Ø135; SS	140 kV; 70 mA	2.6E7 n/s; (140 kV; 70 mA; 4.3E-3 mbar)	[43]
39	31		-	AGD; DC; Cylindrical	inductively coupled plasma generator (13.56 MHz, 2 kW)	DD	Cylindrical; Ø70xL?; quartz	Cylindrical; Ø66xL?; W	Cylindrical; helical wound; Ø9xL120; W	80 kV; 300 mA	1E5 n/s; (40 kV; 10 mA; 1.8E-1 mbar)	[44]
40	32	Nuclear Energy Research Institute, Ankara	SNRTC-IEC device	AGD; DC; Spherical	Ion Gun	DD	Spherical; Ø300; SS	Vac. Chamber	Spherical Wire grid; Ø80; η0.82; SS	100 kV; 80 µA; 1E-4-1E-e mbar	2.4E4 n/s; (85 kV;80 µA; 9E-4 mbar)	[45]
41	33		SNRTC-IEC device (v2)	AGD; DC; Cylindrical	2x Inductively Coupled Ion Gun	DD	Cylindrical; Ø650xL700; Al	Vac. Chamber	Cylindrical Wire Grid; Ø100xL200; t5; η0.90; Iron	100 kV; 1E-4-9E-4 mbar	5E7 n/s; 95 kV; 6E-4 mbar	[46]

#	# Dev.	Institution	Specific Name	Device Type	Assist Mechanism	Fusion Fuel	Vacuum Chamber	Anode	Cathode	Power Supply/ Pressure	Max. Fusion Performance	Source
42	34	Portland State University	-	GD; DC; Spherical	-	DD	Spherical; Ø102; SS316L	Vac. Chamber	Spherical Wire Grid; Ø50; SS	30 kV; 30 mA; 10-100 mTorr	1.20E5 n/s; (24 kV; 30 mA)	[47]
43	35	Comenius University	-	GD; DC; Spherical	-	DD	Cylindrical; Ø70xL80; SS	Vac. Chamber	Spherical wire grid; Ø20; t0.8; W	32 kV; 2.5 mA	2.3E4 n/s; (32 kV; 2.5 mA)	[48]
44	36	Assiut University	-	GD; DC; Spherical	-	DD	Spherical; Ø300; t5 ; SS	Vac. Chamber	Buckyball; Ø80; t1.5; Ti-64	100 kV; 80 mA	n.a.	[49]

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